RAILROAD GAZETTE

FRIDAY, OCTOBER 5, 1894.

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Contributions.

Handling Freight Trains with Air Brakes.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The report of the Committee on "Care and Handling of Air Brakes," presented at the annual meeting of the Traveling Engineers' Association at Denver and published in the *Railroad Gazette*, September 14, states among other things that engineers "can handle 50 cars, equipped with air brakes as well as 10 cars." There are no reasons given why the committee came to this conclusion, nor why "some engineers want to use only a few cars equipped with air at head end of train, instead of all."

To get some further light on this subject, I asked the following questions of a number of engineers and conductors of freight trains, who have had at least four years daily experience in handling trains of 40 cars, in many of which all the cars were equipped with air brakes.

1. In handling a train of 40 cars, wholly equipped with air brakes, how many brakes do you use?
2. Why not all of the 40?
3. What number do you consider sufficient for all practical purposes?
4. Can better time be made by using 20 cars or 40 cars?
5. In descending a heavy grade, how do you handle your train?

In the majority of cases the answer to the first question was 20 cars. The principal reason given why not more were used was that the brake equipment on the cars is hardly ever in perfect condition, there being much leakage; so that the present 8-inch pump on the engines is too small to keep up the required pressure. In case, however, the engine has the 9½-in. pump, better results might be obtained with long trains.

In regard to the question of time, there seems to be a diversity of opinion, some claiming that there would be no difference in the time made, while others claim that better time can be made by using only 20 cars. When pulling up to a water plug with only 20 air brakes in use, the rear portion of the train is steadied by the brakemen with the hand brakes; while with the 40 cars all in use, if the engineer misjudges the distance or the speed, he either runs past the plug or else stops short. He then has hard work to move the train backward or forward, and there is more or less time lost by the air not releasing promptly in some of its cars.

In descending a heavy grade not more than 7 or 8 cars of air on the front end of the train are used, hand brakes being applied on the balance of the train. This is considered the safest method. With the 7 or 8 cars connected and most of the braking being done on the rear portion of the train, with the slack stretched, a good service stop can easily be made. If the 40 cars were in use and anything were to happen to the air, the train would be more than liable to get beyond the control of the crew. It is, of course, understood that to attempt to apply the brakes by hand on cars on which air brakes are in use is dangerous to the men. In consequence of this they will not attempt to touch a brake unless they have an understanding with the engineer that he will not make an application without first giving warning. The majority of answers to the third question were 20 cars.

Damaging cars by not properly applying the air can be easily avoided after the engineer has had sufficient experience, and provided, also, that the brakemen properly attend to their duties. If the first 20 cars equipped with air are in use, the hand braking will all be on the rear portion of the train and the slack will be sufficiently taken up, so that when the engineer wishes to make a service stop very little shock will occur.

There is no greater provocation to profanity on the part of the crew, than to find after being thrown from one end of the caboose to the other, and several draw heads in the train smashed, that you have an engineer whose only knowledge and experience in handling air has been to throw it on, without waiting to take up the slack. The usual result is that the conductor cuts the air off and the balance of the run is made without its use.

The best way to educate the rising fireman in regard to slack is to have him ride over the road on the rear end of the train. After being knocked around a few times by an air hose bursting on the front end of the train his knowledge will have been forcibly impressed upon him; then when he is promoted to the right hand side of the engine he will realize the importance of being careful when he makes an application. W. S. S.

Heavy Engines or Light Grades?

TO THE EDITOR OF THE RAILROAD GAZETTE:

The paper read by Mr. Thompson before the Civil Engineers' Club of Cleveland (see *Railroad Gazette* Sept. 28, p 665) calls attention to the value of low grades for railroads, by comparing the economy of using heavier engines on the one side, or lowering the grade on the other, and the conclusion is reached that it is true economy to improve the grades rather than increase the weights of locomotives. I fully agree with Mr. Thompson as to the importance of low grades, especially where the traffic is large, although I have looked at the matter from a different standpoint from that which he takes. Looking at his paper critically there seem to be several points to which attention may be called.

In the first place, on roads with a large traffic, it seems to me that, most commonly, the question is not the alternative, "improvement in grade" *or* "increase in weights of locomotives;" but more often there arises first the question whether the weights of locomotives shall be increased, and the answer pretty generally seems to have been "Yes," and the weights are then increased to what seems to be the practical limit. When this much is settled the further question arises, whether it is practicable and economical to decrease the grades, and very commonly where the traffic is very heavy, the answer again has been "Yes." The result is the same if it is first decided to reduce the grade. The second step is to increase the weights of engines.

The question as to which is *more* economical becomes of lesser value. Each question, "heavier engines," "lighter grades," is decided upon its merits and independently of the other. Generally speaking, engine weights can be increased gradually, until a great improvement is effected, where a demand for the money to reduce grades would be denied, so that the first step would probably be "heavier engines."

It should be understood that the case discussed in the paper is extreme. Sixty freight locomotives to a division of 100 miles, or 30 freight trains each way a day, is certainly extreme, and the alternative of 50 ft. or 35 ft. to the mile is certainly not a mild alternative. The results obtained depend upon these extreme conditions. Following the same general method of treatment used by Mr. Thompson, the result for 10 trains a day each way would be $12,732 per mile available for changing grades, a result materially different from $27,292.

Next let us see what would be the probable expense if we attempted to reduce a 50-ft. to a 35-ft. grade. Assume a case not extreme, where the length of maximum grade is four miles, with 10-ft. cut at summit, and a slightly deeper fill at the foot of the grade. If the line was well located at first, the original surface heights at summit and base cannot be bettered. A change of grade from 50 ft. to 35 ft. per mile would increase the summit cut from 10 ft. to 40 ft. and the increase in excavation on the two miles would amount to 410,600 cubic yards. If we reckon earthwork at 25 cents per yard (which is certainly low) the cost of earth excavation for two miles of cut would be $102,650, or $51,325 per mile, for which Mr. Thompson finds only $27,292 available.

The real value of low grades, however, depends upon the saving in operating expenses, and this the paper has failed to take into account. No allowance is made for the fact that either "heavier engines" or "lighter grades" allow longer trains to be hauled, with great increase of economy.

The proper method for a railroad considering the question of a decrease in maximum grade seems to me to be this: First, increase your engine weights as much as is advisable. Then determine how much you can afford to spend to decrease your grade, not by reference to the cost of increased weights of engines, but rather by determining how much your decrease of grade will save in operating expenses, and from this by capitalizing, fix the amount you can afford to spend to effect this change in grade. Taking Wellington's figures, with a slight modification in the method of using them, we shall find that with 30 trains a day each way on a division 100 miles long and with the cost per train-mile 80 cents, a change of grade from 50 ft. to 35 ft. per mile would justify an expenditure of $4,785,760, as compared with $682,300 as found by Mr. Thompson. For 10 trains each way we should have $1,595,253.

The figures given by me seem large, but a rough calculation readily followed will show them to be reasonable. If it costs 80 cents per train-mile, or $80 for a train over a division of 100 miles, on a 50-ft. grade, it is reasonable to assume that $12 will be saved per train by reducing to a 35-ft. grade; that is 15 per cent. saving for a 30 per cent. reduction in grade. For 60 trains this amounts to $720 per day and for 300 days $216,000 per year. With interest at 5 per cent. we can afford to spend $4,320,000 to secure an annual saving of $216,000. These figures show the result found above to be reasonable.

It seems to me that it is in determining such questions as where changes in grade are justifiable, the engineer is of the greatest value to the railroad. His services for such matters should be considered indispensable.

C. FRANK ALLEN.

The Production and Consumption of Steel Rails.

BY J. STEPHEN JEANS.

The demand for steel rails has of late greatly fallen off in all the principal countries of the world, and as a consequence, the steel rail producing plants of both Europe and America are only very partially employed. It also appears that alike in Europe and the United States, railway material, instead of being the paramount, has become almost a subordinate feature of the great iron and steel industries. It is natural that manufacturers should desire to know whether this is to be still more the tendency of the future, and that railway economists and shareholders should be desirous of ascertaining how far the substitution of steel for iron in the construction of permanent way is likely to reduce, or has already succeeded in reducing the cost of maintenance.

One of the most striking facts of the industrial situation, as it affects the rail trade, is the diminished production of rails concurrently with a large increase in the railway mileage constructed. Briefly, it comes to this, that while the mileage of railways open throughout the world, between 1883 and 1893, increased from 265,000 to 406,000 miles, the quantity of rails made in the four chief rail producing countries of the world—including probably fully 90 per cent. of the whole—within the same period, fell from 2,870,928 to 2,283,711 tons. In other words, an increase of 141,000 miles, or 53 per cent. in the mileage open has coincided with a decrease of 587,000, or about 20 per cent. in the production of rails. And this decline of rail production has not resulted, as might be expected, from the strongly marked fluctuations that are liable to occur in the progress of railway construction in the United States, which produced approximately nearly similar quantities of rails, as between the two periods, but in the much more steady going rail business of Europe, as the following summary table shows:

PRODUCTION AND EXPORT OF STEEL RAILS FROM THE PRINCIPAL STEEL-PRODUCING COUNTRIES IN 1883 AND IN 1893 IN GROSS TONS.

	1883		1893	
	Production.	Exports.	Production.	Exports.
United States	1,148,700	1,291	1,036,353	15,698
Great Britain	1,097,174	745,100	579,386	462,500
Germany	493,411	176,178	535,000	124,848
Belgium	131,635	80,009	132,972	18,826
Totals	2,870,920	1,002,578	2,283,711	621,872

It is tolerably evident from this statement that the principal cause of the falling off in the rail production has been the decline of exports on the part of European countries, and more especially on the part of Great Britain. It is equally clear that European countries have not been using such large quantities of rails in 1893 for their own lines, despite the fact that the mileage of railways had considerably increased in the interval. Of course, the rail trade had during this period undergone a considerable development in Austria, Hungary, Russia, Italy and Spain, but these countries can hardly be said to do any export business and the main result of their coming into the field has been to supersede English or German made rails by rails of native manufacture, which partly explains the falling off in the exports of the above countries. France again manufactures almost entirely for home requirements, the export of rails not exceeding 9,000 tons a year

The rail industry is naturally one that is liable to serious and uncertain fluctuations. In the United States these fluctuations are almost wholly due to the rate at which new railway lines are being constructed at home—the annual mileage having varied within the last ten years from less than 3,000 to nearly 13,000 miles a year. In Great Britain the fluctuations have mainly been due to the extent to which new railway lines have been laid down in the colonies and other outside countries. In Germany, France and Belgium, and in countries that manufacture wholly for their own requirements, the fluctuations are neither so frequent nor so violent as in the United States and the United Kingdom, the exports in all these cases being of limited extent relatively to home consumption. The extraordinary range of fluctuation in the United States is indicated by the fact that within three years, 1885-1887, the production of rails rose from 959,000 tons to 2,102,000 tons. In the United Kingdom, the fluctuations have by no means been so violent as this, but still, between 1890 and 1892, the production of rails fell from 1,019,000 tons to 535,800 tons, or nearly one-half. The following statement shows the course of the rail industry in Great Britain as between 1880 and 1893, and is a doleful record for the steel industry of that country.

PRODUCTION, EXPORTATION AND HOME CONSUMPTION OF STEEL RAILS IN GREAT BRITAIN, 1880 TO 1893.

Year.	Production. Tons.	Exportation. Tons.	Home Consumption. Tons.
1880	740,000	464,400	275,500
1881	1,023,000	594,400	429,300
1882	1,235,700	733,900	501,800
1883	1,097,100	745,100	343,000
1884	784,900	527,400	257,500
1885	706,500	484,200	222,300
1886	730,300	513,400	216,900
1887	1,021,800	760,100	261,600
1888	979,000	707,800	271,200
1889	647,000	757,900	185,100
1890	1,019,600	732,600	287,000
1891	662,700	552,500	110,200
1892	535,800	380,100	155,700
1893	579,300	462,500	116,800

The above table shows that while the average annual consumption of rails by the railways of the United Kingdom was 361,400 in the five years ending 1884, it had fallen to 170,900 tons annually for the five years, ending 1893, or less than one-half, although in the interval there had been an addition of 2,567 miles to the extent of railway constructed, and an enormous increase of the mineral and other traffic carried, the inference is obvious. Either the railway companies have been holding back their purchases during the later period, or the longer life of steel rails, even under a much heavier traffic has commenced in good earnest to tell its tale. It will be observed that in the four years ending with 1883, the production of steel rails in Great Britain was 1,300,000 tons, or nearly 50 per cent. more than in the four years ending with 1893. It would not be correct to attribute the difference wholly to the general condition of business in the later period. The truth is that 1890 and 1891 were quite as properous years for business generally as any one of the series in the former period. But that is not the same as saying that an equal mileage of railways was constructed in the two periods, nor even if this had been the case would it mean that the same tonnage of rails had been used. In 1880, there was a very large mileage of the then existing lines laid in iron, which was being replaced by steel. To-day, probably not 10 per cent. of the whole railway mileage of the world is laid in iron, so that replacements are almost at an end, and in a general way the time has not yet come for a large business to be done in the renewal of steel permanent way to which Sir Henry Bessemer himself has assigned four or five times the durability of iron.

In the United States the production of steel rails has fallen from 6,500,000 tons for the four years ending 1889, to 5,730,000 tons in the five years ending 1893. In other words, the average of annual production in the former period was 1,620,000 tons, and in the latter period 1,430,000 tons. This decrease is only what might be expected, having regard to the fact that in the four years ending 1889, the new mileage of line laid down was 32,992 miles, whereas in the later period it was only 17,734 miles. Between these two periods, therefore, there was a difference of 15,258 miles in the length of new lines constructed, which, assuming only 100 tons of rails to the mile, would represent for the former period an increased consumption of more than a million and a half tons. In other words, if the same mileage had been laid down in the four years ending 1893 as in the previous four years the consumption of rails for the later period would have been 7,255,000 tons, as against an actual production in the earlier period of 6,500,000 tons. From this it would almost appear as if quite a normal consumption of rails had been absorbed in the renewals of existing mileage in the United States during the four years ending 1893, despite the fact that for the greater part of that period the rail-mills were very irregularly and insufficiently employed.

There has been a good deal of controversy at different times, as to whether the rail mills of the United States have much to hope for in the future from the renewals of existing mileage. One party appears to hold that the rail trade must permanently depend mainly on renewals, and another argues that renewals alone would not count for much after the whole of the existing railway system has been laid with steel. There is probably a good deal to be said for both views. Hitherto the rail trade has mainly depended on new mileage and on the substitution of iron by steel rails. The latter process, however, has now almost been completed. In 1890, the substitution of steel on old iron track took place to the extent of 9,817 miles, but in the two following years the average was less than 1,000 miles per annum. When the iron track has virtually disappeared, the rail trade must lose this source of supply, and if they do not find that new mileage is largely built, their dependence must be fixed largely upon the gradual process of laying down heavier track, which is now going on in all the principal countries of the world. It is likely to be a long time before this work is completed. Over a great part of the railway system of the United States, heavier rails may not possibly be required for thirty, or even fifty years to come. But in all large and increasing centers of traffic, the permanent way will have to be made heavier, as business advances. This will, in the long run, mean a still larger life, and a consequently less frequent renewal of railway lines. Experiments that have been made on some of the Belgian lines, where 100-lb. rails have been laid down for some years past, have led to the conclusion that 100-lb rails will last under moderately heavy conditions of traffic for about 100 years. It is obvious that if this is a reliable estimation, and if the railway system of the United States were laid to-morrow with 100-lb rails, the annual renewals, allowing 150 tons to the mile would not exceed 262,500 tons for the whole country. This assumption, of course, if it has any relevancy at all, is only of value as showing a tendency, but it is a tendency with which both railroads and manufacturers will have to reckon more and more in the future. There can hardly be a doubt that the larger life of Bessemer rails, and especially of the rails of heavier section now being laid down, will diminish the demands for renewals, and that this influence is already seriously affecting the rail industry of the world.

In all countries alike, the falling off in the demand for steel rails has brought about an extraordinary reduction of prices, and a serious want of employment of manufacturing resources. The United States is to-day capable of producing over seven million tons of Bessemer steel per annum, and it is perhaps not too much to say that they could produce between four and five million tons of steel rails, whereas they have no demand for much more than a fifth part of that quantity. In Great Britain the steel rail mills have had a doleful history for the last five years, not having been employed to the extent of more than one-fourth of their capabilities while a number of the principle works have been entirely idle. Hardly a single rail-making company in Great Britain, of which the accounts are published, has paid any dividend for years—at least not from the rail-making branch of its business. On the Continent of Europe, matters are not so bad, partly because the means of production have not been increased to the same extent, and partly because the countries of the Continent, as already explained, depend mainly on home consumption.

New Passenger Station at Syracuse.

The drawings printed herewith show the main features of an elegant new passenger station and train shed at Syracuse, N. Y., for the New York Central & Hudson River road. The structure was designed by Mr. Bradford L. Gilbert, of New York City, and work on the foundations has already commenced.

Fig. 1 is a view from the northeast. Fig. 2 shows the interior of the main room in the station proper. This room, 90 ft. square, is entirely clear, the ceiling being supported by steel trusses, the design of which is shown in figures 3 and 4. The section of the bases of these trusses is shown at the corners of the main hall in fig. 5. The principal features of the station-house are shown in fig. 5 The location of this as related to the tracks and train-shed is shown in fig. 6.

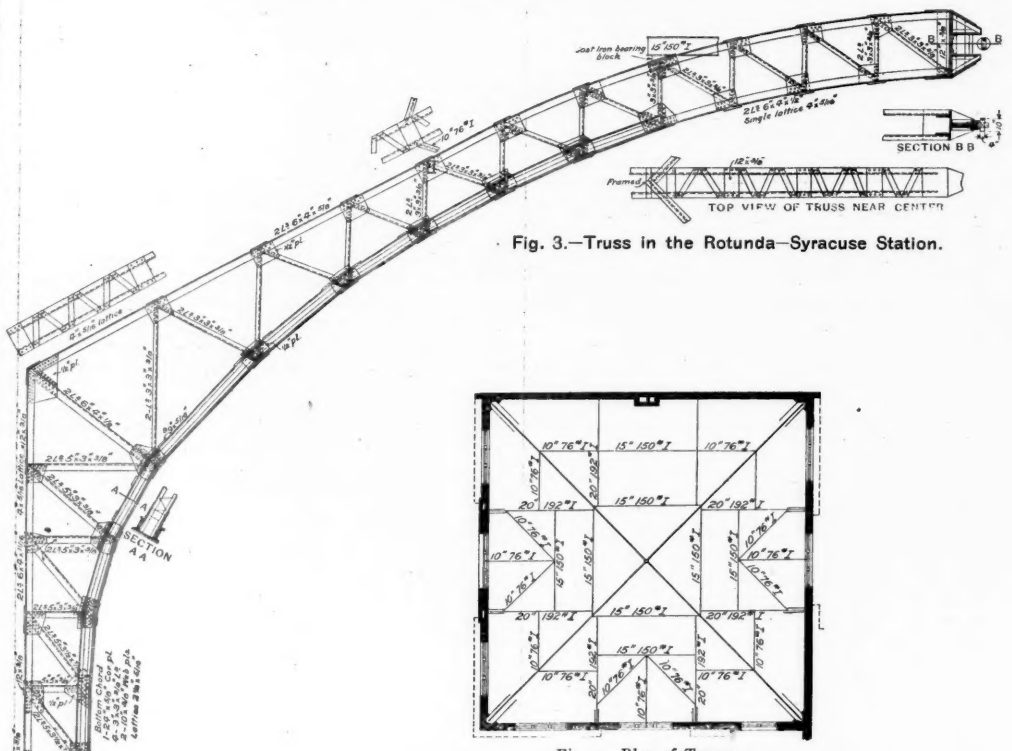


Fig. 3.—Truss in the Rotunda—Syracuse Station.

Fig. 4.—Plan of Trusses.

The main building is 94 ft. x122 ft., and it stands close to and southeast of the site of the present station. The large train-shed will completely enclose the present station and the tracks adjoining it, and it will be finished before the old building is removed. The train-shed is 128 ft. x480 ft.

The main building is Romanesque in design, and the walls are made chiefly of Potsdam sandstone, rock-faced, laid in random courses. The trimmings are of dressed stone of the same kind, and the roof is of glazed Spanish tile. The main entrance is upon West Fayette street, rising by 10 steps to the main floor. The main room or rotunda is 90 ft. x90ft., and 50 ft. high. The floor of the rotunda is of oak, which also is the material of the wainscoting and the furnishing. On the west side of the room there is a large marble fireplace with red sandstone wainscoting. The women's waiting room in the southeast corner is 24 ft. square, and that for men is a trifle smaller. The baggage room is 48 ft. x57 ft., with a concrete floor. Several rooms on the second floor of the building are used for offices by various departments of the road.

As will be seen by the diagram of tracks, there is a sub-way by which passengers can reach all of the platforms without crossing any track at grade. Whether passengers are to be compelled to make this descent and ascent in all cases does not appear. The subway has 8 ft. 2 in. headroom, and will be lined with marble and white enamelled brick.

The restaurant is 28 ft. x128 ft., and is in the basement

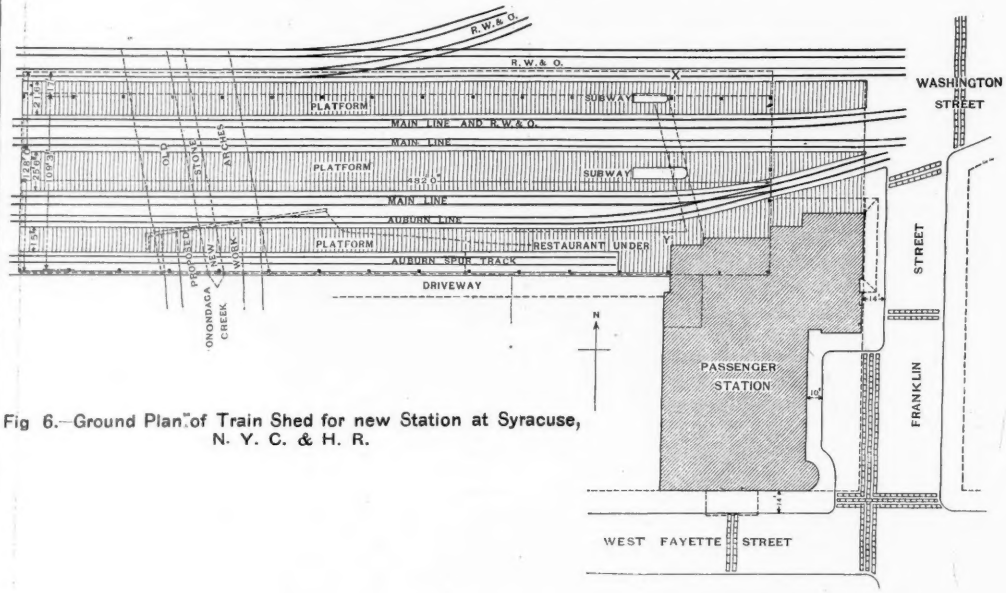


Fig 6.—Ground Plan of Train Shed for new Station at Syracuse, N. Y. C. & H. R.

will be of steel, and is to be built by the Buffalo Bridge Co. All the platforms in the train-shed are one foot higher than the rails, and at the east end they slope down to the track level, beginning at the line X Y. The lighting plan calls for 30 arc lights in the train-shed and 105 incandescent lights for other parts of the building.

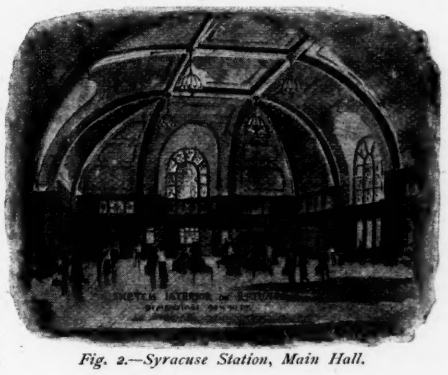


Fig. 2.—Syracuse Station, Main Hall.

Fig. 1.—New Passenger Station at Syracuse, New York Central & Hudson River Railroad.
Designed by Mr. BRADFORD L. GILBERT, *New York.*

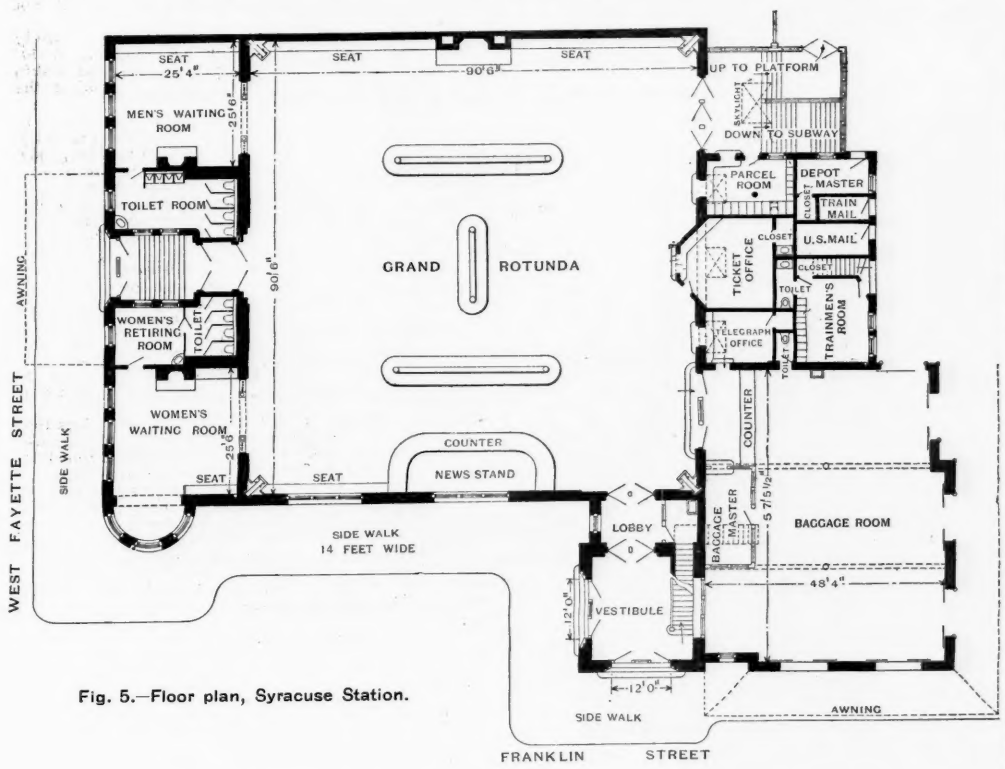


Fig. 5.—Floor plan, Syracuse Station.

The contractors for the main building are James Stewart & Co. of St. Louis.

Train Accidents in the United States in August.

COLLISIONS.

REAR.

2d, on Chicago, Milwaukee & St. Paul, near Sioux City, Ia., a freight train ran into the rear of a preceding freight which had stopped with the caboose on a bridge over the Big Sioux River; several cars were wrecked and two of them fell into the river. A passenger in the caboose was injured.

10th, on Chicago & Eastern Illinois, near Woodland, Ill., rear collision of freight trains, making a considerable wreck. A tramp was killed and the fireman and one tramp were injured, the latter fatally.

14th, on Central of New Jersey, near Easton, P rfreight train descending a grade broke in two and the ear portion afterward ran into the forward one, making a bad wreck. A brakeman was badly injured.

16th, on Columbia & Puget Sound, at Van Asselt, Wash., passenger train No. 20, standing at the station, was run into at the rear by Northern Pacific freight train No. 64. One passenger was injured.

16th, 3 a. m., on Sioux City & Pacific, at River Sioux, Ia., a freight train ran into a freight car which had been blown out upon the main track and the engine and 6 cars were ditched. Three trainmen were injured.

23d, on Atchison, Topeka & Santa Fé, at Corwith, Ill., a freight train ran over a misplaced switch and into a yard engine standing on a side track, wrecking three cars. One engineer and one fireman injured.

24th, on Pennsylvania road, at Anderson, Pa., a freight train ran into the rear of a preceding freight, making a very bad wreck. The broken cars took fire from the fire-box of the engine and many of them were burned up; one engineer killed and one conductor injured.

28th, on St. Louis & San Francisco, at Gratiot, Mo., a passenger train ran into the rear of a preceding empty engine which had stopped at the station. It is said that the engine was not derailed, but was started forward by the shock and ran about two miles; the passenger engine was slightly damaged. There was a dense fog at the time and it is said that the runner of the empty engine was not well acquainted with the road.

31st, on Lake Street Elevated, at West Fortieth street, Chicago, a passenger train ran into the rear of a preceding passenger train, doing slight damage; one passenger and one trainman were injured. There was a dense fog at the time.

And 17 others on 12 roads, involving 2 passenger and 26 freight and other trains.

BUTTING.

4th, 3 a. m., on Seaboard Air Line at Bolton, N. C., butting collision of freight trains, wrecking both engines and several cars. A brakeman was badly injured.

8th, on Rio Grande Western, near Salt Lake, Utah, butting collision between two empty engines, killing one engineer and injuring the other 3 men. It is said that one of the engines was running contrary to a telegraphic order.

10th, on Northern Pacific, at McMillan, Wash., butting collision of freight trains, both running at considerable speed, making a bad wreck. One engineer and one fireman were killed. It is said that the train despatcher gave conflicting orders.

12th, 3 a. m., on Atchison, Topeka & Santa Fé, near Gibbs, Mo., butting collision between passenger trains No. 4 and No 5, making a bad wreck. One engineer and one express messenger were killed and 6 trainmen and 2 passengers were injured.

14th, on Columbia & Puget Sound, at Seattle, Wash., butting collision between a freight train and a Northern Pacific switching freight. Two trainmen were injured.

15th, on Boston & Maine, near East Lebanon, N. H., butting collision between a passenger train and a freight. The baggagemaster was killed and one brakeman injured.

18th, on Stony Clove & Catskill Mountain, near Edgewood, N. Y., butting collision between an empty engine and a passenger train, derailing the empty engine. The collision occurred on a steep grade and the passenger train ran back down hill uncontrolled, the men on the engine having jumped off. It was stopped by Brakeman Porter after having run about 250 rods. The collision was due to the forgetting of a train order by the conductor of the passenger train.

3d, on Cleveland, Cincinnati, Chicago & St. Louis, at New Paris, Ind., a passenger train ran over a misplaced switch and into the head of a freight train standing on a side track, badly damaging both engines. Mail agent and one engineer injured.

And 4 others on 2 roads, involving 2 passenger and 6 freight and other trains.

CROSSING AND MISCELLANEOUS.

3d, on Central of Georgia, at Atlanta, Ga., collision between a loaded and an empty passenger train; one passenger injured.

11th, at Leroy, N. Y., a freight train of the New York, Lake Erie & Western, switching near the crossing of the Buffalo, Rochester and Pittsburgh, was not properly controlled and a part of the cars ran back into a passenger train of the latter road, doing considerable damage. Three passengers and one trainman were injured.

13th, in Buffalo, N. Y, collision between freight trains of the Buffalo Creek and Lehigh Valley roads, badly damaging the engines. There was a dense fog at the time. Four employees were injured.

16th, on Chicago, Rock Island & Pacific, at Trenton, Mo., a passenger rain ran into a dining car, injuring 5 employees. The collision was due to a misplaced switch.

18th, 11 p. m., on Boston & Albany, at Worcester, Mass., a westbound mail and express train ran into an eastbound passenger train, running through a crossover track, badly damaging both engines and several cars. Two trainmen were injured. It is said that a red light was placed on the track to warn the westbound train, but that the runner of that train did not see it soon enough; also that he was running too fast.

20th, on Norfolk & Western, at Houchins, Va., a freight train on an ascending grade broke in two and 39 cars ran back into a following freight, wrecking the engine and 7 cars. Three trainmen were injured.

27th, at Thirty-seventh street, Chicago, a passenger train of the Chicago & Eastern Illinois collided with an engine of the Chicago & Erie; the fireman of the latter was killed and 2 other trainmen were injured. There was a dense fog at the time.

30th, on Chicago, Burlington & Quincy, near Cleveland, Ia., collision between a freight train and an empty engine, killing one engineer and one fireman.

And 9 others on 7 roads, involving 15 freight and miscellaneous trains.

DERAILMENTS.

DEFECTS OF ROAD.

5th, on Oregon Railway & Navigation Co.'s road, at Alto, Wash., a freight train fell through a high trestle, which began to sink when the train ran upon it, and the tender, 15 cars and caboose went down 96 ft. The engine broke away from the tender and got across in safety. The conductor and 2 brakemen were badly injured.

6th, on Chicago, Great Western, at Peru, Ia., a freight train broke through a bridge which had been weakened by fire and the engine and several cars fell to the ravine below. The conductor was killed, and the engineer, fireman and 3 tramps were injured.

15th, 3 a. m., on Atlantic & Pacific, at Cubero, N. M., a passenger train fell through a bridge which had been weakened by a freshet and the engine was overturned. The fireman was killed and the engineer injured. The train was running slowly and the conductor and engineer had examined the bridge before entering upon it.

27th, 1 a. m., on the elevated tracks of the Merchants' Terminal Railroad, on the levee, at St. Louis, a freight train was derailed by a defective frog and the tender and one freight car fell to the street below. The engineer was fatally injured.

And 3 others on 3 roads, involving 3 freight trains.

DEFECTS OF EQUIPMENT.

6th, on Pennsylvania road, at Metuchen, N. J., a car in a switching freight train was derailed by the push pole belonging to the switching engine, which broke and fell upon the track. Three main tracks were blocked for several hours and the switch and signal connections were badly damaged.

12th, on Pennsylvania road, at White House, Pa., a freight train was derailed by a broken axle, making a bad wreck. A man stealing a ride was killed.

13th, on Pennsylvania road, at Newport, Pa., a freight train was derailed by a broken axle and a tramp was injured.

18th, on New York Centrel & Hudson River, at Cheektowaga, N. Y., a freight train was derailed by a broken wheel, ditching several cars. Naphtha from a broken oil tank took fire and exploded; and a dozen oil-tank cars exploded in rapid succession and with great force. The fire spread rapidly through the wreck and 20 cars were burned up. One brakeman was badly burned.

21st, on Western Maryland, at Chaulton, Md., a freight train was derailed by a broken axle and several cars of cattle were overturned. A drover was fatally injured.

23d, 1 a. m., on Chicago & Northwestern, Fort Atkinson, Wis., a freight train running at high speed was wrecked. Three men riding in a freight car were killed and 3 others injured.

27th, on Pennsylvania road, at Wayne, Pa., a freight train was derailed by a broken axle and a brakeman injured.

28th, on Beech Creek Railroad, near Lock Haven, Pa., a freight train was derailed by a broken axle and 15 cars were wrecked; a drover was killed and a brakeman injured.

And 10 others on 5 roads, involving 11 freight and miscellaneous trains.

NEGLIGENCE IN OPERATING.

7th, on Union Pacific, Denver & Gulf, at Utah Junction, Col., a passenger train was derailed by a misplaced switch and the engine was overturned. The engineer and fireman were injured.

8th, on Philadelphia & Reading, near Philadelphia, a passenger train was derailed at a point where the track had been repaired and the new rails had not been sufficiently spiked.

29th, on Erie & Pittsburg, near Sharon, Pa., a freight train was derailed at a misplaced switch and 16 loaded cars were wrecked; the fireman was injured.

30th, on Wabash road, near Dawson, Ill., a freight train was derailed by a misplaced switch and the engine and 9 cars were badly wrecked; the engineer was injured.

And 3 others on 3 roads involving 3 freight trains.

UNFORESEEN OBSTRUCTIONS.

1st, on St. Louis Southwestern near Athens, Tex., the engine of a passenger train was derailed and overturned by a malicious obstruction and the baggage car was derailed. The engineer and fireman were badly scalded.

4th, on New York & Brooklyn Bridge Railroad, at the Brooklyn terminus, a car in a passenger train was derailed and fell off the road-way to the wagon-way, being completely overturned. There were several passengers in the car but no one was much injured. The derailment was caused by the breakage of a curve plate, a piece of which lodged between the rail and guard rail.

5th, on Pittsburg, Cincinnati, Chicago & St. Louis, at Crescentville, O., a freight train was derailed by running over a cow, the engine and 13 cars were ditched, making a bad wreck. The fireman was killed.

5th, on Pittsburg, Cincinnati, Chicago & St. Louis, at Miller's Run, Pa., a freight train was derailed by running over some cattle, and a brakeman and two other men riding on the train were injured.

6th, on Pittsburg, Cincinnati, Chicago & St. Louis, in Chicago, 2 cars in an eastbound passenger train were derailed by a misplaced switch, which is said to have been maliciously turned after a portion of the train had passed over it.

9th, 9.40 p. m., on Chicago, Rock Island & Pacific, near Lincoln, Neb., a passenger train was derailed on a trestle and the whole train fell to the ground about 30 ft. below. The wreck took fire from coal in the locomotive, and, together with a large part of the bridge, was burned up. Eight passengers and 3 employees were killed, and 9 passengers and one employee injured. It is said that the rails had been maliciously loosened and that the claw bar and wrench used for the purpose were found near the scene of the accident.

16th, on Central of Georgia, at Wise, Ga., a freight train was derailed by a Master Car Builders' drawbar, which had fallen upon the track from a previous train.

18th, on Cincinnati, New Orleans & Texas Pacific, at Brannon, Ky., a passsenger train was derailed at a misplaced switch, wrecking the engine and derailing 5 cars. The engineer and fireman were injured. It is stated that the switch was maliciously misplaced.

18th, on Chicago, Milwaukee & St. Paul, near Floodgate, Wis, a freight train was derailed by running over a horse, and a trainman was injured. A wrecking train sent to clear up the wreck ran into it and was badly damaged.

19th, on Wabash road, near Jonesburg, Mo., a freight train was derailed by a horse and the engine and 19 cars were ditched. The engineer and 3 tramps were killed and 2 trainmen and 6 tramps were injured.

20th, on Seattle, Lake Shore & Eastern, at Latona, Wash., a freight train was derailed by running over a cow, and the engine and 13 cars were ditched. The fireman and one brakeman were killed.

21st, 3 a. m., on Colorado Midland, near Idlewild, Col., a freight train was derailed by a landslide, and the engine was overturned. The engineer was killed.

23d, on Norfolk & Western, at Shepherdstown, W. Va., a freight train was derailed by running over a cow and part of the train fell down a bank. The conductor and one brakeman were injured.

27th, on Baltimore & Ohio, at Silver Run, W. Va., a passenger train was derailed by a rock which had fallen upon the track and the engine and the first two cars were badly wrecked. The fireman was killed and the engineer injured.

28th, on Kansas City, Fort Scott & Memphis, near Willow Springs, Mo., the engine of a passenger train was derailed by a malicious obstruction. The engine was put back upon the track and the train started, but it was derailed again by another and similar obstruction (loose spikes) after running about 4 miles.

29th, 2.30 p. m., Minneapolis, on St. Paul & Sault Ste. Marie, near Gladstone, Mich., a passenger train was derailed by a landslide and the engine and 4 cars fell down a bank; the baggage man was injured.

31st, on Chicago & West Michigan, near Brookings, Mich., a passenger train was derailed by running over some cattle, and the engine was overturned; the engineer and fireman were killed and one passenger injured.

And 9 others on 8 roads, involving 4 passenger and 5 freight and other trains.

UNEXPLAINED.

4th, on Florida Southern, near Rochelle, Fla., the engine of a freight train was derailed and fell into a lime sink. The engineer and conductor were injured.

12th, on Concord & Montreal, at Portsmouth, N. H., the engine of a passenger train was derailed and overturned and the engineer and fireman were injured.

14th, on Sherman, Shreveport & Southern, near Dangerfield, Tex., a passenger train was derailed and two passenger cars were overturned. One passenger was injured.

16th, on Toledo, Ann Arbor & North Michigan, near St. Louis, Mich., a freight train was derailed and a brakeman was injured.

18th, on Montana Central, at Alhambra, Mont., 3 cars of a freight train were derailed and badly wrecked. One brakeman was badly injured

20th, on Southern Pacific, near Eldridge, Tex., a freight train was derailed and several cars were ditched. The fireman was killed.

20th, on St. Louis, Vandalia & Terre Haute, near Pocahontas, Ill., a fast passenger train was derailed and the engine and 2 mail cars were ditched. Six trainmen were injured.

27th, on Lake Shore & Michigan Southern, near Erie, Pa., a freight train was derailed and several cars badly damaged. A brakeman on top of the caboose was injured and a man stealing a ride on a platform car loaded with stone was crushed to death between the stones.

27th, on Cleveland & Marietta, near Ava, Ohio, a freight train was derailed and several cars wrecked; one trainman was injured.

30th, at 9.30 p. m., on Delaware & Hudson, near Port Kent, N. Y., passenger train No. 8 was derailed and the tender, two baggage cars and two passenger cars fell down a bank; three passengers and four trainmen were injured. The track, the cars and the engine were all nearly new and the cause of the accident is undetermined. It occurred as the train was leaving a 5-degree curve.

And 20 others on 18 roads, involving 1 passenger train and 19 freight and other trains.

OTHER ACCIDENTS.

2d, on Lehigh Valley, at Pittston, Pa., a car in a local freight train containing gasoline and cotton waste, took fire and burned so furiously that it was thrown into a river to extinguish the flames. Three trainmen and 4 other men were badly burned in attempting to control the fire.

3d, 3 a. m., on Pittsburg, Fort Wayne & Chicago, at Bucyrus, O., west-bound freight train No. 73, was set afire by the explosion of an oil tank car just as the train was stopping for a crossing, and 10 loaded cars and their contents were burnt up, several of them being loaded with hard coal. The road was blocked about 10 hours. It is believed that the fire which started the explosion was set by some tramps who were riding next to the tank car and who had matches and pipes. It was reported that the train broke in two and ran together again, but there is no evidence of this. The town fire department refused to assist in putting out the fire as it was outside their limits, and the railroad company had to bring fire engines, with water in tenders, from Crestline and Mansfield. Five tramps were burned to death.

3d, on New York, Pennsylvania & Ohio, at Urbana, O., a passenger train struck a freight car standing on a side track, damaging the engine and several freight cars. The engineer was injured.

8th, on Atchison, Topeka & Santa Fe, near Barclay, Kan., the engine of a passenger train was badly damaged by the breaking of a parallel rod, and the fireman was injured.

9th, on Missouri, Kansas & Texas, near Rocheport, Mo., the engine and 3 cars of a freight train were badly damaged by a rock which fell upon them, and the fireman was injured.

26th, on Wilmington & Northern, Modena, Pa., the locomotive of a passenger train was badly damaged by the breaking of a driving axle; the engineer and firemen were injured.

28th, on Cincinnati, Hamilton & Dayton, at Busenbark, O., the engine of a passenger train was badly damaged by the breaking of a side rod; the engineer was badly injured.

And 2 others on 2 roads, involving one passenger train and one other.

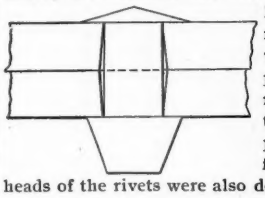
A summary will be found in another column.

Material and Workmanship in a Stand Pipe.

The West Bluff stand pipe of the Peoria, Ill., Water Works, failed on March 30, 1894, and as the East Bluff stand pipe was constructed by the same firm that built the West Bluff pipe and at the same time, it was considered necessary to have an examination made of the pipe that was standing. The method adopted in the inspection was to find first the causes of the failure of the West Bluff pipe and then to examine the East Bluff pipe to see if the same defects appeared in it. It was found that both pipes were substantially the same in material and workmanship and it was recommended that the east pipe be taken down as soon as possible, but the interesting part of the report is that which explains the cause of failure of the West Bluff pipe.

The report says that the most striking fact in connection with the West Bluff stand pipe was the deplorable workmanship. The majority of the rivets in those portions of the stand pipe which appear to have been least affected by the fall became decidedly loose after receiving two or three sharp blows with a rivet-inspecting hammer. The explanation of this was that the plates were punched with punches that were ⅛ in. smaller in diameter than the die. This gave a tapering hole ⅛ in. greater in diameter at one side of the plate than at the other. The plates were put together as shown in the cut and the rivets used were too short. It will be noted that, on the line of contact of the two plates, there is a $\frac{1}{16}$ in. space between the rivet and plates.

This was caused by putting the plates together wrong and by the fact that the rivet was too short to fill the hole in driving. If the rivet had filled the hole it would have separated the plates. The construction made it possible for water to collect between the plates, and in freezing, force the plates apart. The heads of the rivets were also deficient.



Four analyses were made of the material in the pipe and six test pieces were subjected to physical tests; one of the causes of the failure is shown by these to have been the poor material used, it being a high phosphorous steel. The quality of the steel is clearly shown by the results of the chemical and physical tests given in the accompanying table.

ANALYSIS AND TESTS OF STAND PIPE MATERIAL.

COURSE NUMBER.	Bottom.		5th	13th.	7th Course.	
Specimen Number.	1	2	3	4	5	6
Carbon	.....	0.11 %	0.10 %	0.13 %	.....	0.12 %
Manganese	.....	0.61 "	0.39 "	0.59 "	.....	0.50 "
Sulphur	.....	0.117 "	0.08 "	0.053 "	.....	0.071 "
Phosphorus	.....	0.123 "	0.139 "	0.155 "	.....	0.132 "
Original area	1.157	1.143	.938	.586	.855	.868
After fracture area	.867	.813	.734	.404	.428	.623
Elastic limit: lbs. per sq. mile	49,000	48,120	41,580	50,340	40,940	47,240
Tensile strength: lbs. per sq. mile	61,360	59,490	62,900	67,140	61,760	63,480
Per cent. Cloug. in 8 ins.	16.25	15.00	17.75	14.25	23.75	20.00
" reduction in area	25.07	25.88	21.75	31.06	49.94	28.23
Character of fracture				Laminated and dead.		
Cold bending test	Broke at 90°.		Broke at 120°	Bent 180°	Bent 180° flat.	Broke at 180°
Quench bending test	50 % Crystalline.		50% Crystalline	Cracks	Cracks.	50 % Crystalline.

In the report it is said that in stand pipes and similar structures the phosphorous should be kept within .08 per cent., and the material should be capable of bending 180 degrees flat upon itself without showing sign of rupture on the convex side of the bend.

The report was made by Mr. A. B. Bellows, Manager, and T. L. Condron, Resident Engineer in Chicago of the Pittsburg Testing Laboratory..

Protection of Fruit in Cars from Excessive Heat or Cold.*

The following opinions as to the temperatures that are injurious to perishable articles, under different conditions, have been gathered by the Government Weather Bureau from shippers throughout the country in reply to a circular:

In the transportation of perishable freight there are three primal objects to be attained:

1. Protection from frost.
2. Protection from excessive heat.
3. Circulation of air through the car, to carry off the gases generated by the freight.

The temperatures at which perishable goods would be damaged vary greatly with different commodities, their condition when shipped, how long they may be in transit, whether they are kept continually in motion, etc. Injury can occur from long exposure to a temperature but little below 32°, or from a shorter exposure to a greater cold. Oranges slightly frozen, when placed in a cool room and thawed out gradually, are sweetened, but when frozen solid and thawed they have a "sickish" sweet flavor. When oranges have been frozen they can be thawed without injury by putting them in cold water or tight barrels immediately after arrival, and allowing them to thaw out gradually.

A great deal depends on the condition of the car; if the car is tight apples and potatoes will stand a zero temperature. Irish potatoes in a store, with a cellar under them, will stand a temperature of 10°, and without a cellar a zero temperature will not hurt them. Articles shipped from the North to the South during winter should be perfectly dry.

As a rule, truckers will not haul vegetables to the cars for shipment when the temperature reaches 20 degrees, or lower, and in no case when it is near 32 degrees, if raining or snowing.

Shucked oysters shipped in their own liquor in tight barrels will not spoil if frozen while in transit. Thick or fat clams or oysters will not freeze as readily as lean ones, as the latter contain much more water. Oysters will not freeze as readily as clams. It is safer when oysters or clams in the shell are frozen to thaw them out gradually, in the original package, in a cool place. Clams and oysters in transit through a snowstorm will not freeze as readily as when the weather is fair and a stiff wind prevails. Canned tomatoes when frozen become stringy, canned fish soft and mushy, lemons black and spotted, olives soft and rancid, pickles soft and unsalable.

Shippers and agents concur in the statement that danger in transportation by freezing has been practically eliminated in the shipment of produce by modern methods; the lined car suffices in spring and autumn and usually during the winter, while in extreme weather the Eastman heater car is used. It is claimed that a car load of produce, like potatoes, will stand a lower temperature when the car is in motion than when at rest.

Fruit should not be subjected to a temperature lower than 35° or higher than 60°. Wines should not be subjected to a temperature lower than 20° or higher than 72°. In ordinary freight cars perishable goods can be shipped with safety with the outside temperature at 20°, and in refrigerator cars at 10°. If perishable goods are put in a box car upon a cold day, and they have radiated considerable heat before being shipped, they will not be able to withstand as low a temperature. Fruit wrapped in heavy brown paper will stand 15° more cold than if not wrapped.

In refrigerator cars, perishable goods may be safely shipped with a temperature outside of from zero to 10° below, the car first being heated. It is not safe to ship olives in any car, unless heated artificially, when the temperature is below 25°.

The better class of refrigerator cars, such as used by the California Fruit Co., will carry all perishable goods safely through temperature as low as 20° below zero, provided they are not subjected to such temperatures longer than three or four days at a time, while with the ordinary refrigerator cars temperatures of zero are considered dangerous, especially if the goods they contain be of the most perishable kind.

Beer can be shipped at an outside temperature of 10° if placed in a refrigerator car and the kegs packed in hay or sawdust and fresh stable manure, the packing being 6 inches or more all around. Eastern grapes bear low temperatures better than California or Malaga. While a temperature as low as freezing (32°) will not injure potatoes for eating purposes, yet they will fail to sprout in the spring.

Roses and cut flowers will not be injured unless the temperature falls to 32°. Roses need as low a temperature as possible without freezing, because they are shipped as buds and would develop if the temperature were high.

Precautions taken in shipping are papering, packing in straw or sawdust, boxing, barreling with paper lining, shipping in paper-lined cars, refrigerator cars, and cars heated by steam, stoves, and salamanders. . . Extra precautions are taken with trees, etc., when passing over mountains, and no shipments are made when the temperature is likely to be zero anywhere in the higher regions. Cars containing perishable goods are sometimes, when a north wind is blowing on the prairie, covered with canvas on the north side.

Oranges shipped from Florida to points as far north as Minnesota are started in ventilator cars, which are changed at Nashville to air-tight refrigerator cars, the ventilators of which are kept open, provided the temperature remains above 32°, until arrival at St. Louis, from which point the ventilators are closed and the cars made air-tight. In winter time refrigerator cars are used

*Extracts from a circular issued by Mr. M. W. Harrington, Chief of Weather Bureau, Department of Agriculture, Washington.

without ice in forwarding goods from the Pacific coast, and in p ssing through cold belts or stretches of country the hatches are closed, and the cars being lined and with padded doors, the shipment is protected against the outside temperature: but in passing through warmer climates the ventilators of the cars are opened in order to prevent the perishable goods from heating and decaying. Manure is largely used to protect perishable goods, the bottom of the car being thickly covered with it, and in some cases it is put on top of the goods. To protect goods shipped in an ordinary car, the sides of the car should be protected by heavy paper tacked to the wall and by the addition of an inner board wall a few inches distant from the other one. A car thus equipped and packed with produce surrounded by straw will retain sufficient heat to prevent injury for 24 hours, the average air temperature of all parts of the car being at least 12° higher than that of the outside air.

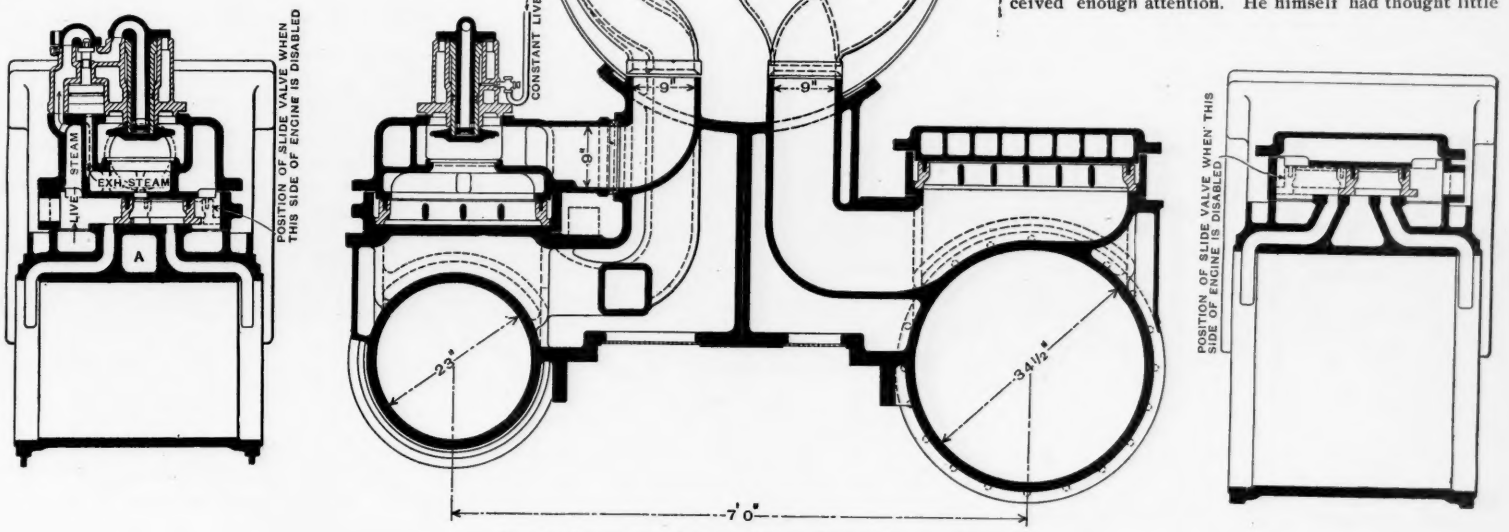
Oranges loaded in ventilated or common cars should be transferred to refrigerator cars when the temperature reaches 10° above zero. When oranges are transferred to refrigerator cars, or if loaded in ventilated refrigerators, and the ventilation is closed, the car must be iced sufficiently to prevent heating. Ventilators on cars containing bananas, lemons, and other delicate fruits, must be closed at a temperature of 40°.

Lined cars, that is, cars lined with tongued and grooved boards on the sides and ends, leaving an air space of about 4 inches, are considered the best by heavy shippers of potatoes, as they can be heated by an ordinary stove, and will stand a temperature outside of 20° below zero, when a man is in charge to keep up the fires.

The difference of temperature inside and outside of a car is from 5° to 15°, depending whether on it is an ordinary freight car or refrigerator car, whether lined or not, and whether there are strong winds. The difference of tempeature in a box car and the outside air is from 3° to 6°, according to how tight the car is built. For ordinary winter weather, the temperature ranging from 10° to 30° above zero, refrigerator cars may be used for shipment to any distance without being heated. Freight from the Pacific coast to the Mississippi Valley, or even to the Atlantic coast, has to pass through almost every variety of climate at any time of the year.

The Dean Compound System.

The accompanying illustrations show the general arrangement of steam passages in Mr. F. W. Dean's latest design of compound locomotive for heavy freight service, which, it will be observed, differs from those previously shown in the *Railroad Gazette* only in points of design, the original features being retained. In this system the exhaust from the high pressure cylinder, instead of passing down through a central port in the valve seat in the usual manner, passes through the top of the valve and the balance plate into a small cavity above, from whence it flows, when the intercepting valve is open, out into a passage leading to the receiver. It has until recently been the practice to conduct the low pressure steam from this point through a passage leading downward outside the steam chest and back through passage A under the valve seat to the receiver. The present arrangement allows the steam to pass directly from the intercepting valve to the receiver through a side extension to the steam chest cover. This extension is fitted to the saddle casting by means of a ball joint as shown in our illustration. This arrangement makes possible a large and direct passage from the high to the low pressure cylinders.



Dean's Compound System—Heavy Freight Locomotives.

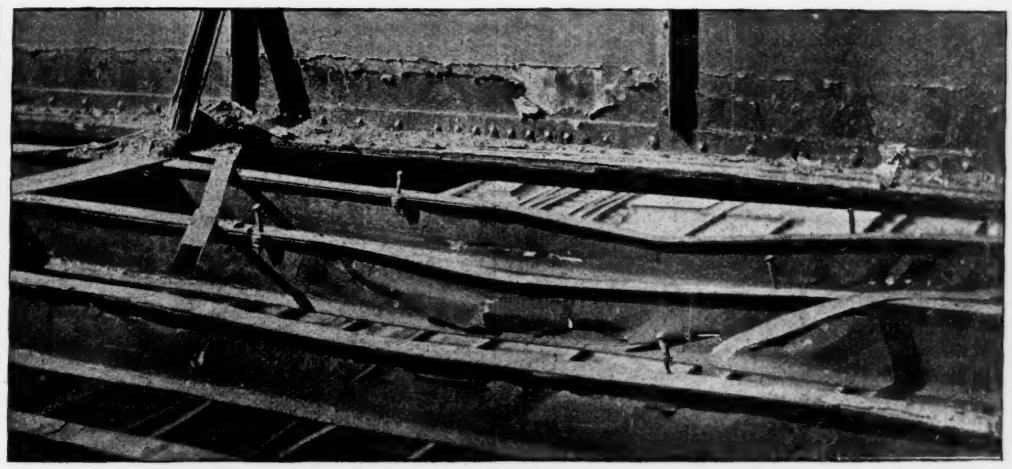
The receiver is of the same form as the previous designs, and consists of two oval internally ribbed passages through the smoke-box.

The design of the intercepting and converting valves forming a part of Mr. Dean's system, were illustrated in our issue of Aug. 3, 1894.

Corrosion of a Viaduct in Chicago.

It was recently discovered that the viaduct on West Van Buren street over the tracks leading south from the Union Depot in Chicago, was in an unsafe condition, the lower edge of the girders and the beams and stringers having been badly corroded by the action of the gases and smoke from the locomotives passing below.

Our illustration shows the appearance of some of the parts affected after the flooring had been removed. It will be seen that the webs of some of the stringers have been eaten entirely through and weakened to such an extent that wagons passing over have broken down the top flanges. The flat diagonals on the top of the stringers are entirely eaten away for some length and the lower flange of the plate girders are in bad condition. One of the beams was so badly corroded that holes could be made in it by a blow from a heavy hammer. The viaduct has been in place about 15 years.



Corrosion of a Viaduct in Chicago.

City Engineer Artingstall has notified the railroad companies that a new viaduct must be erected at once and will begin the removal of the present structure as soon as plans for a temporary viaduct can be made ready and the material prepared.

The Central Railway Club.

The regular meeting of the Central Railway Club was held in Buffalo on the 26th, President A. M. Waitt in the chair. The President announced the death since the last meeting of three members, J. K. Bole, W. T. Small and T. W. Gettman, and a memorial committee was appointed consisting of Messrs. Robert Potts, Eugene Chamberlain and George W. West. A committee on the annual banquet was also appointed, consisting of Messrs. Thomas A. Bissell, Clarence W. Rood and A. C. Robson. The President urged that special effort be made to increase the membership of the club.

CAR CLEANING.

Mr. T. H. Soule and Mr. Robert Potts, the committee, submitted their report on the "Best Practice in Cleaning Passenger Equipment." In brief the report said that cars on long runs, 200 miles or over, should, on arrival at terminal stations, in all non-freezing weather, be thoroughly washed on the outside with cold water. The fountain brush, that is, with a hollow handle and perforated head through which a stream of water can be constantly supplied, has been recommended as better than the common brush. If a bucket and brush are used care should be taken to renew the water as it becomes gritty. Hand rails and door knobs should be wiped clean and trucks and other parts which can be reached without going under, wiped. In freezing weather cars should be wiped dry; better results will be got than by the use of warm water. In addition to the ordinary washing one of the roads represented by the committee (Lake Shore) uses a cleaner known as the perfection car cleaner, which is said to be absolutely non-injurious to varnish. It is applied with an ordinary brush. The use of compounds for car cleaning is recommended as a subject for discussion.

Passing to the inside of the car, lamps should first be attended to, water coolers emptied, rinsed and wiped out inside, all closets and the like thoroughly washed and rinsed and then rinsed again with a solution composed of chloro naphtholeum and water. This will keep them practically odorless. Cushions should be taken out, doors and windows opened, car thoroughly dusted and wood work and glass wiped. The floor should be mopped with water, sponged under the seats and under steam pipes with soft soap or the like and rinsed with cold water. Cushions should be thoroughly dusted as should all upholstery.

The use of compressed air is recommended as another interesting subjection for discussion.

In the discussion Mr. Potts said that on the Michigan Central's Canadian division they used a bamboo handle with gas pipe connection for the fountain brushes. Mr. West had found the fountain brush too cumbersome and abandoned it.

Mr. McCarthy said that on the Northern Central once in three months they treat the interior of the cars with crude oil and tripoli, wiping thoroughly with dry waste. This wiping is repeated at the end of trips.

Mr. McKenzie had found the fountain brush unsatisfactory and much injury had been done to cars with it. He now washes the car thoroughly and then uses a brush, but prefers dry waste. Compressed air had been found injurious to the finish of the interior of cars.

Mr. Potts favored the fountain brush, as it cleans the surface well and saves the labor of one man.

President Waitt thought that this subject had not received enough attention. He himself had thought little about it until within the past two years. He found soap solutions injurious to the exterior finish.

The following letter from Mr. Lentz, of the Lehigh Valley, was read:

"At terminal stations, in dry weather or when cars are dusty, dry cotton waste is used for cleaning the outside; on wet days a brush and clean cold water is used. No soap or cleaning compound is used for the outside cleaning. For the cleaning of the inside dry waste is used for rubbing down the woodwork. The floors are cleaned by the use of compressed air, Hunnewell's soap powder and water. At our principal lay-over points and at our passenger car shops the upholstery is cleaned by the use of compressed air; at less important points the rattan beater is used. During the winter we aim to clean the upholstery twice a month, and once a week during the summer months. For cleaning, scouring and polishing brass, nickel plate, etc., we use U. S. Metal Polish, and a preparation made by ourselves, composed of Wrigley's mineral cleaning and scouring soap dissolved in ammonia. This gives the best results with the least labor."

Mr. West presented a report on "The Best Construction and Practice of Locomotive Driving Boxes." This is printed in full in another column.

A paper on "Terminal Yards," which was read at the March meeting by Mr. Marford, was laid over until the October meeting.

The President announced the following subjects and the committees to report thereon at the next meeting in October:

"Car door fastenings, hangers, and brackets. The needs for perfect service from the above and the practical results from various common devices in use, and recommendations as to good devices that have shown desirable results as to safety and freedom from breakages." J. D. McIlwaine, R. S. Miller and John Turner.

"Pistons, piston packings, piston and valve stem rod packing. The best in service and comparative cost." E. A. Miller, L. Ames, W. G. Taber.

The Myrtle Avenue Improvement of the Brooklyn Elevated Railroad.*

While heavy grades are objectionable on elevated as well as surface railways, the use of double stations, as distinguished from island or intertrack stations, increases operating expenses more rapidly than heavy grades. Double stations are frequently convenient, sometimes necessary, always expensive. Could the Manhattan Railway Company do without them, it would pay nearly 1 per cent. larger dividend on its stock.

The present paper describes a single attempt to improve grade and stations on the Brooklyn elevated road, the difficulties met, the methods of overcoming them, and the ensuing profit.

The grade on the surface of Myrtle avenue reached 4 per cent. for some distance east of Raymond street, and necessitated a heavy grade if the track of the Hudson avenue and Myrtle avenue lines were to meet at a common low elevation. Nearly all the stations on this line were island stations. The Grand avenue station was one of the exceptions, and formed a transfer for passengers between the Myrtle and Lexington avenue lines by means of overhead foot bridges. To change the next two adjacent stations to island stations would introduce large economy.

The Washington avenue station was built after the road was completed, and was placed on a grade of 1.4 per cent. and permanently fixed in position by agreement. Engines frequently stall in starting heavy trains on this grade. The long stretch (1,700 ft.) of 2.06 per cent. grade between Navy street and Carlton avenue caused many accidents to engines and more trouble than any other equivalent length of road.

A proposition was made in 1889 to change the two stations and the steep grade, but it was deemed impracticable, on many accounts, and it was abandoned until 1893. It was then proposed to run five car trains over Myrtle avenue, and to make it easier to do this, it was decided to cut the heavy grade in two, lengthways, and to lengthen the upper part of it.

Studies were made for changing the grade below Carlton avenue and above Washington avenue, also for changing the two stations to island stations. The financial depression of last year and the use of electric cars caused the work to be completed only as far as the iron-work for the new station, leaving the balance to be finished at a later day. The preliminary estimate of cost was $40,000.

The lowering of the grades between bents 68 and 92 was regarded as the most serious portion of the work, since it must be done without interference with travel and with entire safety to the public. Plans and estimates were asked for, but nothing more satisfactory was received than those already prepared, and no contractor would take the work except on a percentage of its cost. It was, therefore, decided to do it by day labor.

The earlier plans proposed cutting a section out of each column a little above its base, and splicing the two parts together with plates riveted on the sdes; this avoided the awkward cutting of about 20 columns on which the "drop-end" girders extended down the side of the column about 2 ft., and also retaining the rigid connection between columns and girders, which it seemed wise to maintain as a safeguard against any tendency to overturn. The months of May and June were most available in which to do the work, as the travel is then lighter. It was important to finish it, also, before August, when the cable wires at the surface trolley roads were to be attached to this structure.

An effort was made and much time lost in an attempt to cut the columns by means of a cold saw. An apparatus was finally made which could be worked either by electric power or by hand. This, it was estimated, would cut a column in less than half an hour. The machine weighed 600 lbs., and cost $500. An actual test showed that all the channels could be cut by hand for about the price of the saw, and machine cutting was finally abandoned. The first plan was to cut the columns near the base, but the difficulties were much increased by an attempt to handle a heavy machine at a distance above the ground. The plan of cutting at the top of the column was developed on account of the greater difficulty in splicing at the bottom, and, also, that the roadway below must be kept clear for the passage of vehicles, the trouble being increased by the relaying of the surface railroad tracks and the repaving of the streets, which were progressing about the same time as the work on the structure.

The columns were firmly fixed in cast-iron bases about 3 ft. square and bolted to brick masonry piers, and it was finally decided to take advantage of the columns to steady the lowering apparatus, and cut the columns at the top.

Two vertical sticks of southern pine timber were suspended from each end of the transverse girders by built tee irons bolted to the sticks and to the girders, to aid in preventing tilting. Two channel irons, held together by four bolts, formed clamps placed at top and bottom of the columns to steady the timber; the middle bolts served as separators, and the end bolts as guides.

Two 60-ton hydraulic jacks were used, one under each of the two smaller sticks at the ends of the girder. The larger timbers were left 12 ins. short of reaching the main blocking; the space was filled by carefully dressed blocks, 4 ins. thick, 14 ins. wide and 3 ft. long, each bolted through edgeways, to prevent splitting. The brackets between the columns and girders were cut out, the blocking carefully placed, and lock wedges driven, to give a firm support. The side plates and angles forming the caps of the columns were removed and placed in the new position for the caps. The horizontal seat plates were cut out to fit the back channel, which was left intact, and the edges of the vertical angles so cut as to make sure of their entering the channel freely. When all was ready, the side channel of the column was cut off by two men, one man holding the tool, while it was struck with a heavy hammer by another. The channel would be frequently cut by two men in two hours. The men worked on a platform formed of loose planks, enclosing the columns and suspended by ropes. When the new column cap was completed, blocks 6x6x8 ins. were piled on it in pairs and wedged under the end of the girder to give additional support. The cutting of the columns at the summit amounted to 5 ft. 7¼ ins., and after three bents had been cut, the girders were at once lowered 4 ins. The cutting was extended until the girders at the summit could be lowered 12 ins. All the cutting was then completed, and the general lowering began, commencing at the easterly or upper end, so as to produce grades of not more than 0.6 per cent. The lowering was done by two gangs of six men each, one on each side of the street at each of the columns, two handling the jack, two the blocking, and two adjusting the clamps.

The jacks had 12 ins. lift, with let-off cocks, by which the lowering could be checked at any point.

In lowering, the jacks were first set up so as to relieve the pressure from the 4-in. block, one block was then backed out, and one 3-in. thick inserted, this in turn backed out, and one 2-ins. thick inserted, then one of 1 in., so that in case of accident there could never be a drop of more than 1 in. After 12 ins. had been lowered, the girders were blocked directly on the iron columns, so that the jacks could be slacked and the timber sawed off 16 ins., then another lowering of 4 ins. brought the blocking to the standard of 12 ins. When a 4-in. drop was carried over the line, generally one girder at each end would reach its final bearing. Such a drop was carried over the line in three and a half hours.

No lowering was actually done under a moving train, although this was not a necessity. All trains were run over the entire work at reduced speed. The lowering generally took place between 10 a. m. and 5 p. m., when the travel was lightest—the intervals between trains being about one and a half minutes.

The shortening of the track due to the lowering was about ¾ in. There was no shearing of bolts, and the shortening seemed to distribute itself uniformly, and to be taken up by the slotted holes at one end of each span, a length of 2 inches was cut out of the rails, as they were previously quite tight on the grade.

The entire force employed consisted of 30 men, 2 carpenters, 6 drillers, 8 riveters, 14 trackmen, helpers, etc.

The transverse girders at Vanderbilt avenue are strong enough to carry the island station; it was, however, necessary to reinforce the corresponding girders at Washington avenue and Cumberland street. This was effected by placing sub-girders under the old ones, the adjacent flanges being riveted together.

The track girders had to be removed and replaced with new ones. This was done a span at a time, and the floor systems of the new spans placed between midnight and 5 o'clock, when trains were run at intervals of 15 minutes in either direction.

The old track system having been removed with the lateral bracing and fastenings of the track girders, they were lowered to the street by gin poles, operated by hand winches, the heaviest weighing 14,000 lbs. When these were out of the way the floor beams and stringers of the through span were lowered into position by hand falls from a small A frame resting on the girders. When these were secured, the new ties and rails were laid in place and connected up. This work of changing the entire track system and supports on 60-ft. spans in from six to seven hours was probably the most trying and expeditious of all the work done on the improvement, as only 8 or 10 men could be used to advantage.

There were 18 other girders for new platforms placed in position, as the old ones were too light for the work. They were handled with great ease by the use of a boom derrick, working from the center over the side of a flat car. All heavy material was delivered by lighters at the dock, about one mile distant. The old material had to be handled and carted away at night, and the expense was heavy.

The station buildings were removed by raising them from the floors and sliding them over on rail skids to a heavy flat car, and moved by a locomotive to their new position. They were then slid over into place and dropped down on the new floors previously prepared. The weight of each was about 15 tons. Light needle beams formed the frame on which the buildings rested while moving, and the sliding was done with 10-ton hydraulic jacks. The car passed easily around the curve and no trouble was anticipated at any other point. No station was closed to business, except from midnight until 6 in the morning of the two nights when the buildings were moved. About $3,000 was saved by using the old buildings instead of building new ones.

The total cost of the improvement was $39,534.32. This makes no allowance for tools and materials left over, which were available for other work.

The direct saving by the use of the two island stations is estimated at $2,920 per annum, while the annual interest, at 5 per cent. on the cost, is $2,006.34. There is a saving also due to the economy in the operation of the trains, due to the lowering of the grade. They were formerly raised 14 4-10 ft. in 800 ft., and they are now raised the same height in 1,300 ft. In the first case, 58-100 minute being the time occupied by the trains in passing, and in the last case 84-100 minute. Nearly 400 trains are raised through this height each day, and the estimated saving on horse-power per annum by lengthening the time is 4,500,000, or a total saving from this item of $1,125 per annum.

These estimates would show that the change would have been a profitable one had it cost three and one-third times as much.

* Abstract of a paper by O. F. Nichols, Chief Engineer, before the American Society of Civil Engineers.

Track Elevation in Chicago.

The work of elevating the tracks of the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific is well under way on the first mile, extending from Sixteenth to Twenty-fourth streets, Chicago. As stated last week, the tracks first to be raised are those on the east, all trains taking the west track, while the others are being raised. On account of the narrow right of way on the east of the tracks it has been necessary to build a retaining wall nearly the whole length of the section. This wall, which is now nearly completed, is of rubble masonry and aggregates about 5,000 cubic yards. A comparatively small amount of retaining wall will be required on the west side of the tracks, the right of way being of such width that the bank may have the natural slope except in two or three places where short lengths of wall will be required. The work of filling has already commenced, the material used for this purpose being sand from Dunn Park, a station in Indiana about 30 miles from Chicago.

It is an interesting feature of this work that it is all, so far as possible, done by day labor. The stone is cut and loaded at the quarries by contract, and the sand loaded at the pit by a steam shovel, but the handling and placing of all material after unloading is done by day laborers hired by the railroad companies. The sand is unloaded from the cars by a Barnhardt ballast unloader furnished by the Marion Steam Shovel Company.

The east end of the abutments at Archer avenue are nearly completed, and the work well started on those at Eighteenth and Twenty-second streets. The contract for the superstructure at Archer avenue has been let to the Lassig Bridge & Iron Works, of Chicago, and the east half of the structure is to be in place within 30 days. Bids have been received on the structure for Twenty-second street, and Mr. L. H. Clark, engineer in charge of the work, has asked for bids on the structure to be placed at Eighteenth street.

Chicago Sanitary District Matters.

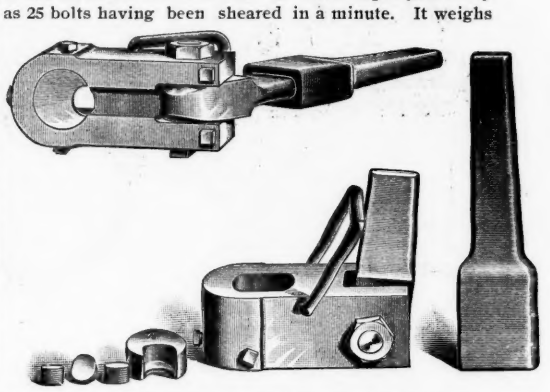
The report of Chief Engineer Randolph for the year 1893, which has been delayed on account of pressing daily work, shows the expense of engineering and construction during the year to have been $2,484,270, of which sum $251,555 is charged against the engineering account and $2,232,715 against construction. In the period between June 1 and Dec. 31, the total amount of material excavated was as follows: Glacial drift, 3,070,848 cubic yards; solid rock, 1,304,894. Of these amounts 1,247,822 cubic yards of glacial drift and 136,534 cubic yards of solid rock were from the river diversion, the remainder from the main channel.

The work on Section "E," for which the firm of Streeter & Kenefick had the contract, was considerably delayed, as was explained in our issue of Aug. 31, by the discovery of a hard conglomerate material where borings made by the engineering department had shown glacial drift, and the consequent refusal of the contractors to perform the work at the rate agreed upon. Acting upon the report of the Chief Engineer the Trustees refused to revise the contract and ordered the contractors to resume work within ten days. This they agreed to do, but failed to exhibit any indications of an intention to do so in good faith. The work was therefore taken from the firm and the Board advertised for bids for the completion of the work.

Bids were received from 13 firms, the amounts named ranging from $670,810 down to $401,880, at which figure the work was awarded to the firm of Angus & Gindele, of Chicago. They figured upon the removal of the glacial drift at a price of 27 cents per cubic yard and the rock at a price of 70 cents per cubic yard. The next lowest bid was $457,015, while that of the firm of Streeter & Kenefick, on which the contract was originally awarded, was about $431,000, or $29,000 higher than the amount of the bid of Angus & Gindele. The contract was awarded last week to the firm last mentioned.

The Johnson Portable Staybolt Cutter.

The portable staybolt cutter, which is shown in the engraving herewith, is a new tool just put on the market by the Henry C. Ayer & Gleason Co., of Philadelphia. Its action is so obvious from the engraving that a description is unnecessary. This tool has been used on bolts as large as 1⅛ in. in diameter; it does its work rapidly, as many as 25 bolts having been sheared in a minute. It weighs



about 15 lbs. Two cutter plates are furnished with each tool, namely, ⅞ in. and 1 in., but special sizes will be supplied as required. It is intended for use in cutting off the projecting ends of staybolts in locomotive boilers before riveting, leaving about ⅛ of an inch for riveting down. It is especially useful in cutting radial staybolts which must otherwise be cut by hammer and chisel. Cutting a bolt in this way has a tendency to loosen it in the sheet, and sometimes splits the bolt, but with the Johnson cutter no strain is brought on the bolt. This feature is considered to be of especial value for old boilers. It is claimed that the cost of the tool can be saved on from three to five boilers.

Interchange at Chicago.

At the September meeting of the Western Railway Club, Mr. Barr moved that the subject of interchange of cars at Chicago be taken up as a topic for discussion. An abstract of the discussion follows:

MR. BARR: We have in the vicinity of Chicago about

twice as many inspectors per car inspected as at any other point on our road. I am inclined to think that each road employs fully twice as many inspectors at this interchange point or at any other interchange point that it does at any intermediate point. Then, we carry on our inspection at interchange points, not to see that the car is safe to run, not to make any repairs that may be necessary, but to protect the company receiving the car from any damage due to an improper condition of the car when received. That occupies possibly nine-tenths of the time of our inspectors. In addition to that, there are a great many minor interchange points on our roads where we find it necessary to keep an inspector to protect the company receiving cars from other roads. We, also, have elaborate systems of keeping a record of the condition of cars passing interchange points

There is one more important point in connection with our present system of inspection, viz: One of our neighbors offers me one of our cars with a slightly defective draft-timber, which might run for the next three or four years, doing satisfactory and perfectly safe service. Our inspector discovers a little crack, and requires a card from the other road; the car comes onto our road, and because the card is on the car, and that draft timber a little damaged, we feel that it is to our advantage to remove the timber, put in a new one and charge the road furnishing the car to us. And we all do it; it is proper under this system, and I am inclined to think that in that way a large amount of money is spent unnecessarily. In addition to that, we have our disputes as to the necessity for a card, thus causing delay to traffic, and expense and loss of time in correspondence and, very frequently, large expense in the way of switching charges.

I am inclined to think that the remedy for this would be to treat a large number of items, if not the whole car, precisely as we treat wheels and axles; that is: If a C., M. &. St. P. car, for example, is on one of the roads entering into the agreement in this matter, that road is authorized to do any necessary repairs to that car, as well as change wheels, and to bill against the St. Paul road for the cost of doing the work. The only point is that they shall certify on the bill that the damage was not caused by derailment or wreck. The C., M. & St. P. Road in return will bill against the other roads for any work which is done on their cars. That covers the whole ground; with possibly this exception, viz.: in case a number of roads centering in Chicago agree to treat the cars in this way, they will often receive cars for which a card will be demanded in passing off their line at opposite terminals. In that case I would say that the cards which the road was compelled to furnish would be a voucher for a bill against the road owning the car, in case any bill was rendered on the card. In case we do not want to take the whole car, we might specify a large number of the principal items, so that we will not be bothered any more at Chicago than we are at some intermediate points.

MR. PECK: I know frequently of cars having been returned for a bolt costing two cents, thus incurring switching charges of $2.50. It is not for the safe running of the car that the inspectors look out, but for defects that they can be returned on. The interchange of Chicago averages 5,000 cars a day, and the record shows that 66 per cent. of those cars have more or less defects, and the records also show that the inspection on cars costs more than the repairs do in interchange work. In 1891 the number of inspectors at Chicago was 256, and of car repairers, 1463; the total number of men kept on interchange work thus being 1,719. The number of cars repaired daily was 1,076; of cars transferred, 5,629; average number of cars inspected daily for one man, 39; cost per car 4.25 cts. The daily receipts of cars was 10,069. If the inspectors find a defect they must make a record of it, if they don't some one sees it and reports them, where a car might run ten years and no harm come of it. I have known cars to run several years after a defect had been reported on them.

MR. WAITT: The present generally adopted method of interchange by inspection entails a great deal of unnecessary delay, and thereby decreases the car mileage. I have had a little experience in the direction that is spoken of by Mr. Barr, in interchange with our principal connections, at Buffalo with the New York Central and Lehigh Valley, at Cleveland with the Nickel Plate, Big Four, Pennsylvania & Erie, and at Toledo with some 11 roads there. One of the objects of our arrangement is that the cars are not to be set back, but that the road that receives them and finds them in bad order shall repair the cars if necessary, and shall have authority to bill against the delivering road. The adoption of this plan has resulted in a marked reduction in the transfers of cars, and also in the delays. With one of our connections we carried out the plan to an even greater degree, and we are at the present time making repairs wherever necessary on their cars without card, and rendering bill, and they are repairing our cars when necessary and rendering bill. Inspection between the two roads has come down to an inspection for safety only. This has resulted in a reduction of over 50 per cent. in the expenses at interchange points where the cars pass from one road to the other. The plan has been working now for a year and a half between our two roads, and it has been in every way a success.

MR. POTTER: Theoretically Mr. Barr's scheme would probably be all right, but practically I believe it would be a failure. I have not given the matter very much thought, and possibly with full investigation I might think differently; but I do not think that we could enter into such an agreement in Chicago without consulting our other connections. In our case, we would have to consult the Pennsylvania Railroad people, because we interchange cars with them on the same basis that Mr. Waitt speaks of as being in force on his line, and we inspect for safety only, therefore the Pennsylvania Railroad would have to be a party to this agreement, for the reason that we would not accept bills for their cars unless they were a party to the agreement.

MR. BARR: With reference to the Pennslyvania cars, I do not think that we could make an agreement at Chicago that would take in any more than the cars of the roads entering into the agreement. The other cars interchanged at Chicago would have to be treated under the usual Master Car Builders' rules. I believe there is a general feeling among all the members of the Master Car Builders' Association who are interested in interchange of cars, that we are getting a little off the track. I propose that a number of us enter into some such arrangement as has been suggested and compare our bills at the end of the year with what they had been the previous year. I do not think that we can get very much benefit in the matter of reducing car repairs on the road, because we must be repairing to meet the present views of interchange inspectors, which requires keeping up, practically, a perfect car, but I do think that, if the arrangement was made general, we would be able to save each other many thousands of dollars that we put on cars now simply to enable the cars to pass an interchange point.

MR. POTTER: As I understand Mr. Barr, he does not expect to save anything in the way of inspectors; and so far as the delay to traffic is concerned on account of the inspection, I have not heard any complaints for two or three years. The real benefit to be derived from Mr. Barr's plan, as I see it, is that we eliminate the liability of cars being repaired and charged for and billed for that are not actually worn out, but are covered with defect cards because some one demanded them for a slight defect. Now we never will be able to take off our inspectors altogether, because we must inspect for safety. In Chicago the inspectors we have are principally at junction points, and the reason we have so many is that there are so many points where we interchange with other roads.

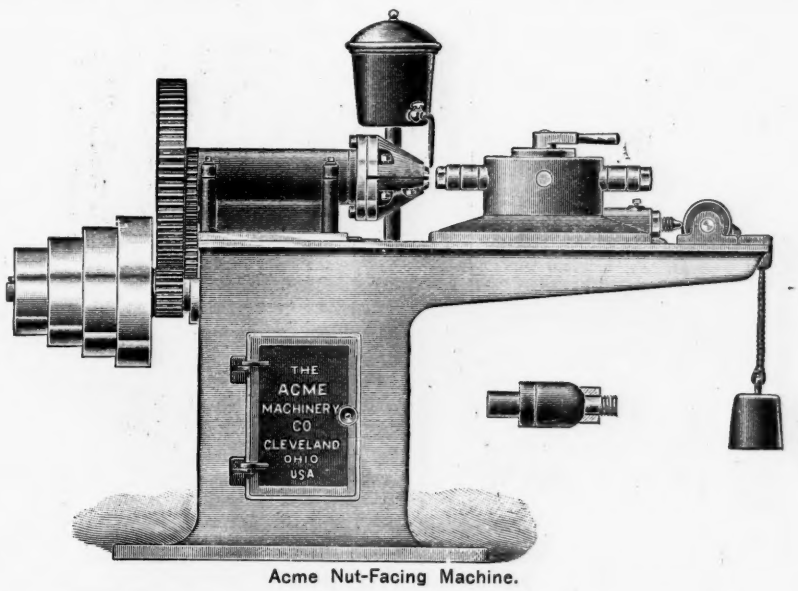
MR. MACKENZIE: I can not see where Mr. Barr's plan is going to help us at all. There are many roads that cross our line that would take off their car repairers and never do anything to the cars. The consequences would be that we would have to take care of everybody's cars, if we were honest enough to do it, and the further consequence would be that the cars would run down. I believe that your inspection in Chicago is all wrong, and always has been; you don't begin to inspect up to the Master Car Builders' rules. I believe in a joint inspection, where the inspector has charge of the repairs, so that whatever he says settles the case. I cannot agree with Mr. Barr that his plan is going to save any money, because, as I said before, there are a great many roads that would not do anything on the cars—they will just discharge all the car repairers.

MR. PECK: I have found out that joint inspection is not always joint inspection—what is joint at Buffalo is not at Omaha. A car, for instance, will come from San Francisco; it will pass Omaha and Kansas City all right, but when it comes to Buffalo, the road delivering it there has got to pay for a defect that existed in California, because the Buffalo and the Omaha men look at defects in cars in different ways. To inspect cars as the rules ask, would take a good inspector all day to inspect ten cars, but we expect him now to inspect 150.

After some further discussion it was voted that a committee be appointed to formulate a code of rules and an agreement between Chicago roads on the basis of Mr. Barr's scheme. Messrs. J. N. Barr, A. M. Waitt and John MacKenzie were appointed on this committee.

A New Acme Nut-Facing Machine.

We show a new nut-facing machine made by the Acme Machinery Co., which is thought to have many new and valuable improvements over tools made heretofore for chamfering and facing nuts and bolts. The cutting head is arranged to hold three tools made of bar steel, one for facing, one for chamfering the corners, and a third to remove the first thread in the nut. They can be removed, ground and replaced in a few minutes. The spindle to which the cutter head is attached, is driven by a four-step cone pulley, and geared 4½ to 1, thus having sufficient power to face large nuts with ease and the additional advantage of facing the smaller sizes at the proper speed.



Acme Nut-Facing Machine.

On the carriage is mounted a turret with a broad key to keep it in line, and a lever-nut to clamp it in position as shown. The carriage is moved forward to the cutting head by a cam journaled on the ways of the bed. The cam is driven by a worm and worm wheel, thus giving the carriage a steady, forward movement, and the weight hanging from the front end of the bed returns after the nut has been faced. The advantage of a turret to hold the nut arbors is, that the nuts can be removed and replaced much quicker and with less exertion than is possible on a machine where the arbors revolve and the cutting head remains stationary.

Locomotive Driving Boxes.

At the last meeting of the Central Railway Club, in Buffalo, Mr. George W. West, Superintendent of Motive Power of the New York, Ontario & Western, presented the following report from the committee on "Best construction and practice on locomotive driving boxes, including consideration of the comparative merits of solid bronze boxes compared with cast iron or cast steel with bronze lining and with cast iron or cast steel with ribs of bronze having soft metal strips":

Your committee to consider the best construction and practice in locomotive driving boxes are unanimous in their convictions that the solid bronze box is not to be recommended for general use. We do not agree as to the relative merits of cast steel as compared with cast iron box, nor with solid brass linings compared with the gib brass in connection with soft metal filling.

Our reasons for not recommending the general use of solid bronze box are as follows: First, greater first cost; second, undue expansion when hot, causing box to stick in jaw of frame; third, when box becomes worn in crown, the sides are apt to close up, pinching journal and resulting in a hot box.

As to the relative merits of cast steel and cast iron boxes, one member of the committee reports excellent results from the former having gib brasses with soft metal filling. His experience covers a period of 18 months, during which time no undue lateral motion developed, and there was entire freedom from hot boxes. The freedom from lateral motion may possibly have resulted from the soft metal strips the ends of which wore against the wheel hub.

The argument in favor of solid bronze bearing is as follows: The first cost is less than gib brass with soft filling. If the journal gets hot there is no soft metal to melt and plug up oil holes. A box with gib brass is more liable to break on account of cracks starting from the corners of slots cut for the brass.

The argument in favor of the solid bronze crown pressed into the cast iron box with two strips of soft metal one inch wide, extending to the full width of the box, is that we believe the bearing will run cooler on account of the soft metal.

The argument in favor of the sectional bearing composed of bronze gib wih soft metal filling is that there will be no hot boxes to melt the soft metal filling. Out of nearly 400 boxes changed in the past 18 months, from solid to sectional, only three have had soft metal run out, and on the same class of engines, solid bearings that required renewals in from six to eight months are now run with sectional bearings twice that time.

The committee heartily indorses the practice now in vogue on many roads of planing the flanges straight at the center for a distance of 2½ inches, tapering from there to top and bottom, which allows the box to adjust itself when one wheel strikes a low joint, thereby preventing the breaking of the flanges.

Two of the committee having had no experience with steel boxes, prefer cast iron boxes to steel, as they are fearful of excessive side wear with the latter.

Efficiency of Brakes Hung from Truck Bolsters and from Car Body.

A recent letter from Mr. R. H. Soule, Superintendent of Motive Power of the Norfolk & Western, encloses some results of an air-brake experiment of considerable interest, which are given in the tables printed below. Concerning this matter Mr. Soule writes: "You will remember that we were lately talking informally of the relative merits of freight truck brakes as hung from the truck bolster and from the car body. I then stated that we had made some experiments at Roanoke with an air-brake car (with brake beams hung from truck bolster) to determine the difference in the effect of the application of the brake when the car was loaded and when it was unloaded. We ran a box car in back of our foundry, attached a passenger engine to it, made several applications of the brake while the car was light, then loaded it with 60,000 pounds of pig iron and repeated the experiment. The results indicate that there is very slight difference in the effect of the brake (when the brake beams are hung from the truck bolsters) as between the loaded car and the unloaded car."

The letter of Mr. G. R. Henderson, Chief Draughtsman of the Norfolk & Western, transmitting the tables, follows:

"We have made a test on S. I. C. L. car No. 55,343, to determine the difference in the braking power with cars which have brake beams hung from truck bolster when loaded and empty. The attached tables show the weight, capacity, size of wheel, etc., of the car which was experimented with.

"You will notice in the first table, which gives the air pressures in brake cylinder and auxiliary reservoir for different travels of piston and various reductions in pressure by the engineer's brake valve, that when the whole power of the service application is given by equalizing the pressure in auxiliary reservoir and brake cylinder there is comparatively little difference whether the car be loaded or unloaded.

"With small reductions in the train pipe the variation

of pressure is considerable, but when the brake is fully applied this difference becomes insignificant.

"The second table gives the comparative travel of piston, with an emergency application for car light and loaded. This, you will notice, is on an average about ¾ inch.

"The comparative tests showing the effect when light and loaded, were made by putting the dead levers in the corresponding holes in the guides.

"As our T. C. trucks have the center of brake shoe about 12 inches above the rail, the variation will probably be still less than in this car, where the center of brake shoe was 10 inches above the rail when the car was empty."

BRAKE EXPERIMENTS WITH S. I. C. L. CAR NO. 55,243, ROANOKE, VA., MARCH 19, 1894.

Light weight of car, 28,000 *lbs.*; *capacity*, 60,000 *lbs.*; *settled*, ½ *in. loaded with* 60,000 *lbs.*

Pressure to Train Pipe.	Reduction by Brake Valve.	Dead Lever in First Hole.				Second Hole.				Third Hole.				Fourth Hole.			
		Auxiliary Reservoir.		Brake Cylinder.		Auxiliary Reservoir.		Brake Cylinder.		Auxiliary Reservoir.		Brake Cylinder.		Auxiliary Reservoir.		Brake Cylinder.	
		Light.	Loaded.	Light.	Loaded.	Light.	Loaded.	Light.	Loaded.	Light.	Loaded.	Light.	Loaded.	Light.	Loaded.	Light.	Loaded.
70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
65	5	58	60	25	10	57	60	30	15	58	63	35	14	58	63	48	25
60	10	55	55	25	25	56	56	40	30	55	56	50	30	55	56	50	45
55	15	58	50	47	45	52	50	50	46	54	50	54	50	55	55	55	50
50	20	50	50	47	47	52	50	50	47	54	50	54	50	55	55	55	50
45	25	50	50	48	47	52	50	50	48	54	50	54	50	55	55	55	50
40	30	50	50	48	47	52	50	50	48	54	50	54	50	55	55	55	50

9⅛ in. from center of brake shoes to top of rail, with car loaded; wheels 23 in. diam.

TRAVEL OF PISTON IN EMERGENCY APPLICATION.

	Light.		Loaded.
First hole	8⅛ in.		8⅜ in.
Second hole	7⅛ "		8 "
Third hole	6 "		6⅛ "
Fourth hole	4⅜ "		5¾ "

Car equipped with wooden brake beam.

Both reservoir and cylinder gage invariably showing 60 lbs. pressure (regardless of piston travel) with emergency application.

A Historical Sketch of Railroad Signals.*

(*Concluded from page 615.*)

About the year 1846 it became common practice in England to concentrate the switch and signal operating levers at a central point in yards and terminal stations. The objects in view were safety and economy. It was found, however, that this concentrated control introduced new dangers of a very serious nature. The signal man, through mistake or carelessness, often gave conflicting signals and switches, and many serious and fatal collisions resulted from this cause. It then became evident that something would have to be done to secure the harmonious operation of these concentrated nests of switch and signal levers. The agitation arising from the loss of life and limb, led to the introduction, step by step, of what is now known as the interlocking system. Col. Yolland, of the Royal Engineers, one of the Government inspectors of railways, made authoritative demands for better public safeguards. The first attempt at an interlocking machine was made by Mr. Gregory, of the Croydon Railway, about the year 1843. Improvements were soon afterwards introduced by Stevens, Chambers, Saxby and others, and I will briefly describe and illustrate some of these early machines. Fig. 1, shows a simple double track junction. There are two switches operated by levers 3 and 4 in the signal cabin. There are four home signals, viz.: 2, 2, 5 and 7, and three distant signals, viz.: 1, 6 and 8. This makes a total of 8 levers. It will be seen at a glance that if signals 2 and 5 could be simultaneously placed in the "all clear" position, there would be great risk of one of the trains thus signaled cutting the other in two. Again, if signals 5 and 7 could be cleared simultaneously for two converging trains, these trains would very likely collide. To show the degree of danger at such a junction, where no interlocking existed, and leaving the distant signals out of the question, it may be stated that there would be about sixty-four possible combinations of switches and signals, only thirteen of which would be safe.

On plate 146, fig. 195 shows a side elevation of Chambers' interlocking apparatus, erected at Willesden Junction in 1859. This consists of levers A, B, for operating the switches, and stirrups *d* for operating the signals. Wires were connected from the top of the stirrups to the signals, and the switches were connected to the levers by rods as shown. A tappet attached to the lever was carried in a box across the path of the stirrup ends, and so arranged that the stirrups could not be depressed until the proper adjustment of the switch-moving levers had taken place. Although this frame did not afford complete interlocking, it was considered a great advance on what had gone before, and it received the high approval of the Government Inspector.

Fig. 196 represents a modern signal or switch lever in side elevation. C is the fulcrum, e is the lever tail to which is attached the switch or signal connection. The lever is capable of being latched in two positions by means of the spring latch d, which is lifted out of the notches in segment D by means of latch handle F. In the earlier locking machines, all the locking was attached directly to the main lever, but owing to the greater compactness of parts and lessened strain, nearly all modern machines have the locking connected to the latch. This is known as "preliminary" or latch-locking, and the old style as "lever-locking."

Fig. 198 shows a plan view of an early lever locking machine, designed by Saxby. The levers are shown in cross-section, and it will be readily seen that when lever A is reversed, it will impart such action to the pivoted hook plates E and F as to release lever C and lock lever B.

We shall see modified forms of this type on plate 153, in which figs. 241, 242 and 243 represent a machine designed by Saxby and Farmer. The hook plates give place here to bevelled rocking shafts. At fig. 246, another modification is shown; the only difference is the screw motion for driving the locking hooks.

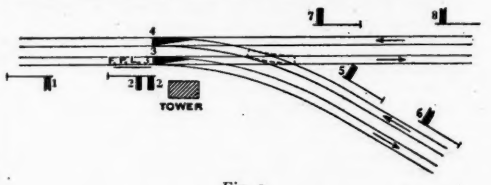


Fig. 1.

At plate B at figs. 217 and 218, Rapier's machine is shown. The construction of this machine was extremely simple. Each lever carried a light quadrant A, A., suitably notched to receive transverse locking bars, B, B. Locks were riveted into these bars at suitable points. The bars were provided with handles, and it was necessary to make the proper adjustment of locking bars by hand, to release any desired combination of levers and at the same time lock all conflicting levers. This was, of course an unnecessarily tedious operation.

Fig. 219 shows the machine designed by Stevens & Sons, and I may say that this has been, and is to-day, by far the best lever-locking machine, owing principally to its simplicity and durability. The lever frame arrangement needs no explanation. The interlocking is performed by tappets E, which are pinned to the body of the lever and slide through locking boxes FF. Fig. 220 shows the locking in detail. M, P, B, are three levers, to

*From a lecture by Mr. Arthur H. Johnson, delivered before Lawrence Scientific School, Harvard University, Cambridge, May, 1894.

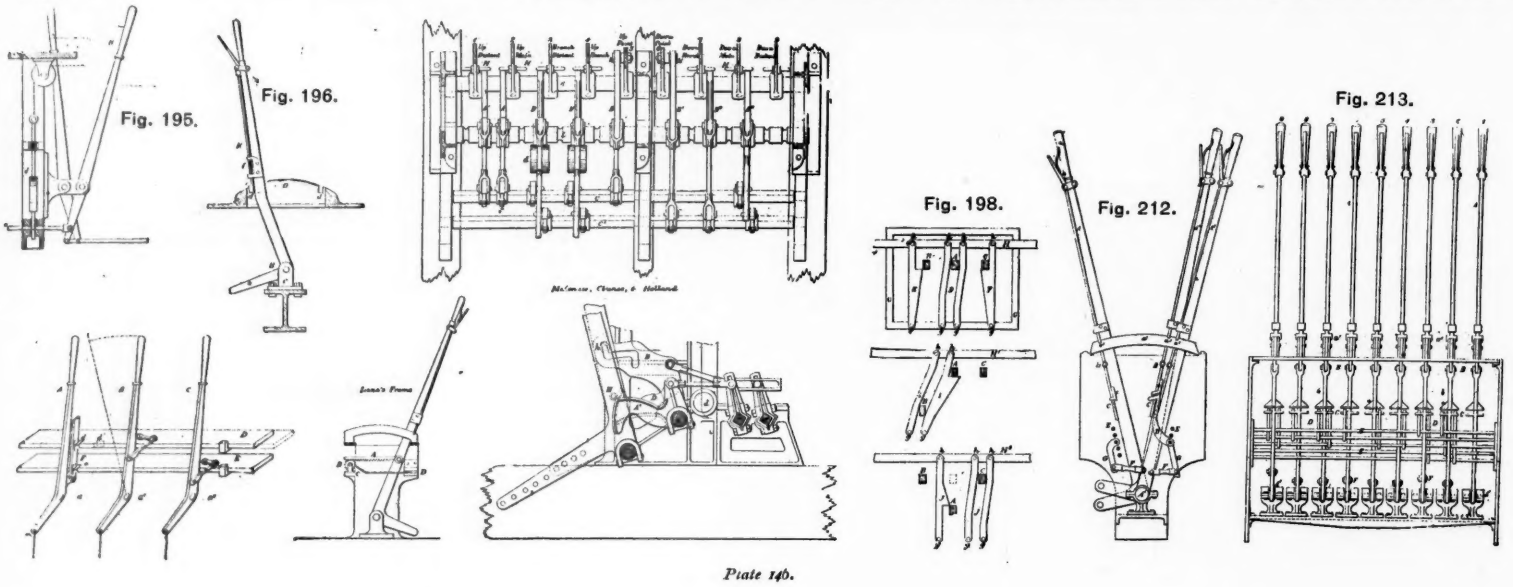


Plate 146.

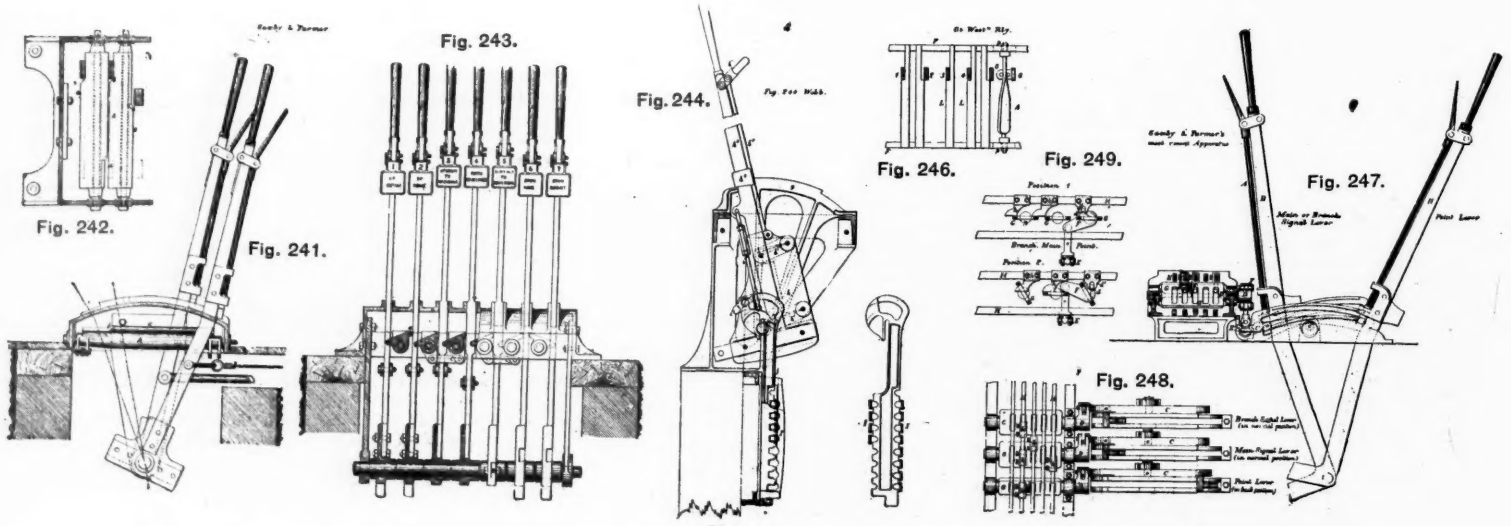


Plate 153.

History of Railroad Signals.

"Plate 146" and "Plate 153," with paper by Mr. A. H. Johnson.

which are attached steel tappets E, E^1 and E^2. These tappets rest in the grooved lock box G, G, and have bevelled notches cut in them, i, i^1, i^2 and b^3. It will be seen that lever B cannot be pulled over, because the passage of its tappet E^2 is obstructed by the lock dog F^1 until lever P is first pulled over, so as to bring notch b^3 opposite dog F. Lever B can then be reversed, shooting dog F^1 into notch b^3 and thus locking lever P in its reversed position. The reversal of lever P has, however, shot the dog F into the notch i^1 of tappet E^1, so that lever M cannot be reversed. Thus any desired combination of locking may readily be effected by these bevelled dogs. Most of the modern latch locking machines use this tappet and dog principle.

We now come to a consideration of the "latch-locking" or "preliminary action" type of machine. In this type the intention to move a lever, as expressed by grasping the latch handle, and raising the latch, is made to lock all conflicting lever latches. Two inventors, viz., Saxby and Esterbrook, filed applications for a patent on this idea about the same time, and this led to expensive litigation between them, as to which of the applicants was entitled to the patent right. The Supreme Court finally decided that both should have the right to manufacture. On plate 146, figs. 212 and 213 show Mr. Esterbrook's machine. It will be seen that the latch rod was prolonged below the segment, so as to engage with locks thrown into or out of gear therewith by the action of conflicting levers.

On plate 153, figs. 247, 248 and 249 show the well-known Saxby & Farmer machine. The end of the spring latch rod engages in a reversing rocker C, which in turn gives motion to the transverse reciprocating bars H, H, which carry the locking dogs, by means of universal link, E, F, and spindle G. Fig. 244 shows the London & North Western standard machine. The locking in this case is arranged vertically, the notched tappet J engaging with suitable stops screwed to the locking bars I. I. One of these machines was on exhibition at the World's Fair, as was also the Johnson interlocking machine shown in Figs. 1 A and 2 A. In the Johnson machine, action is imparted to the vertical locking tappets by means of a reversing rocker, mounted on the lever and operated by an extension of the latch rod. The chief point about this locking is its extreme simplicity, and the accessibility of the parts for examination and repair.

It will be well before leaving the subject of interlocking machines, to mention briefly the various machines for controlling switches and signals by means of steam power, acting through the medium of Hydraulics, Pneumatics or Electricity or a combination of these elements.

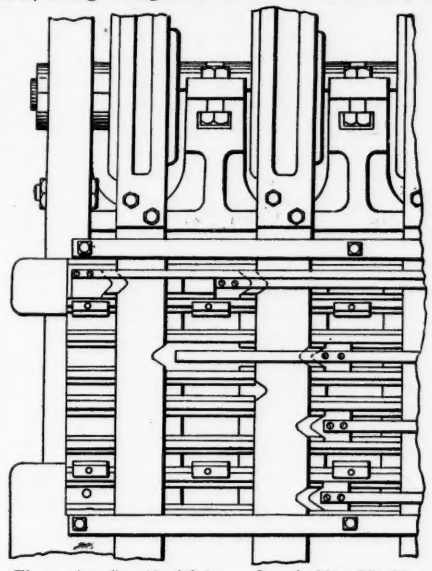


Fig. 2 A.—Detail of Johnson Interlocking Machine.

Numerous experiments in this line have been made during the last twenty years, and the best example of this type is undoubtedly the electro-pneumatic apparatus designed by Mr. Westinghouse. The Hydraulic machine of Mr. Servattez, of Rome, Italy, is also worthy of mention. As there is nothing gained in safety and economy in this type of machine, it has found but little favor with railroad officers, owing to its comparative complication and delicacy of parts.

As every one is familiar with the general design of a point switch, it will not be necessary to describe the same. It took many years, however, to prove to some people that the point switch is preferable to any other known design. As first constructed each rail was moved separately and the fireman dismounted from his engine and forced the tongues or points over by means of a crowbar. It was considered that the man who first coupled the switch rails together by a connecting rod, had made an important invention. Switches are connected to the interlocking machines by bell cranks, the arms of which are usually about 9 inches long, and connecting rods or tubes about 1¼ inches outside diameter. These rods are carried by anti-friction rollers placed about 7 feet apart, so as to prevent buckling. Switch rods, over 90 feet long, are fitted with automatic temperature compensators to guard against the wrong adjustment of switches by expansion and contraction of the connections. This is accomplished by means of any reversing gear. For instance, a plain sway beam, placed half-way between the operating lever and the switch, will compensate for the whole length, or, as the end of the rod at the lever is fixed, that half of the rod will expand towards the compensator and will force the expansion of the other half to take place at the compensator and thus leave the switch practically fixed.

Railroad switches of whatsoever pattern, are divided into two classes, viz.: facing and trailing. They are termed Facing Switches when they are so placed that trains pass over them in the direction from left to right, fig. 159, and trailing switches when they are so placed that trains pass over them in the opposite direction. It is therefore obvious that switches used for shifting purposes are both facing and trailing, and it is also clear that a switch used in the facing direction is much more dangerous than a trailing switch, because the facing switch may stand for the branch when it should stand for the main, or it may stand half-way, thus causing a derailment of the train. In case a main line train passes in the trailing direction over a switch that is set for the branch, the switch

(*Concluded on page 689.*)

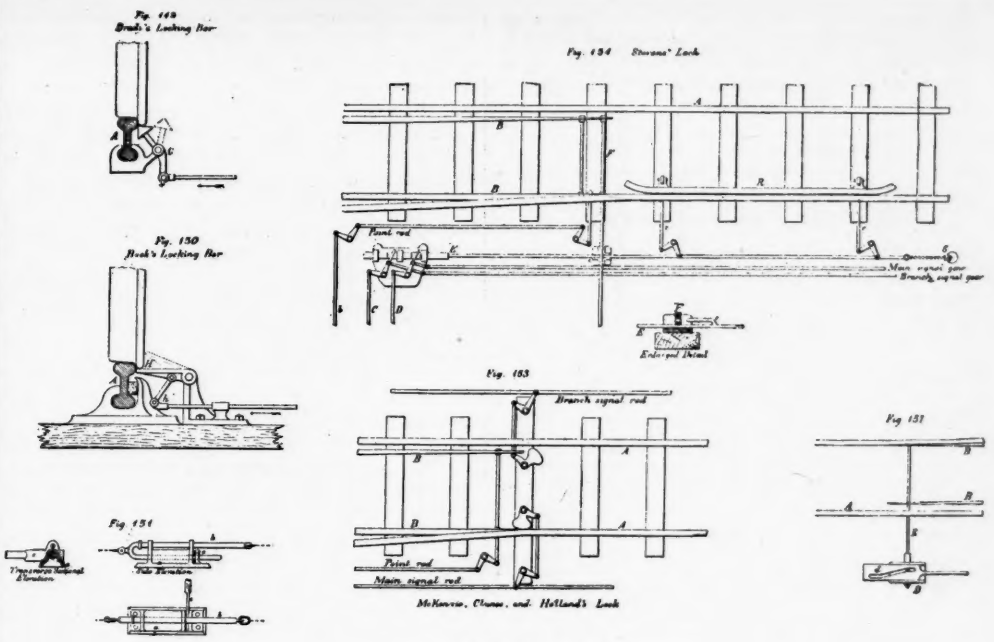


Plate 133.

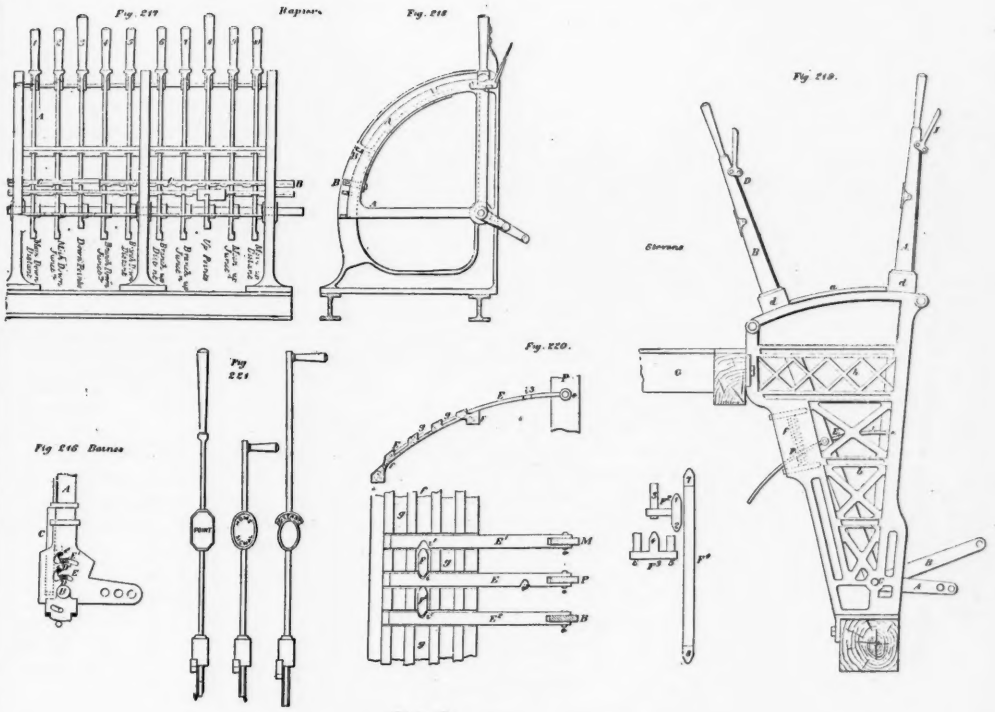


Plate B.

History of Railroad Signals.

"Plate 133" and "Plate B," with paper by Mr. A. H. Johnson.

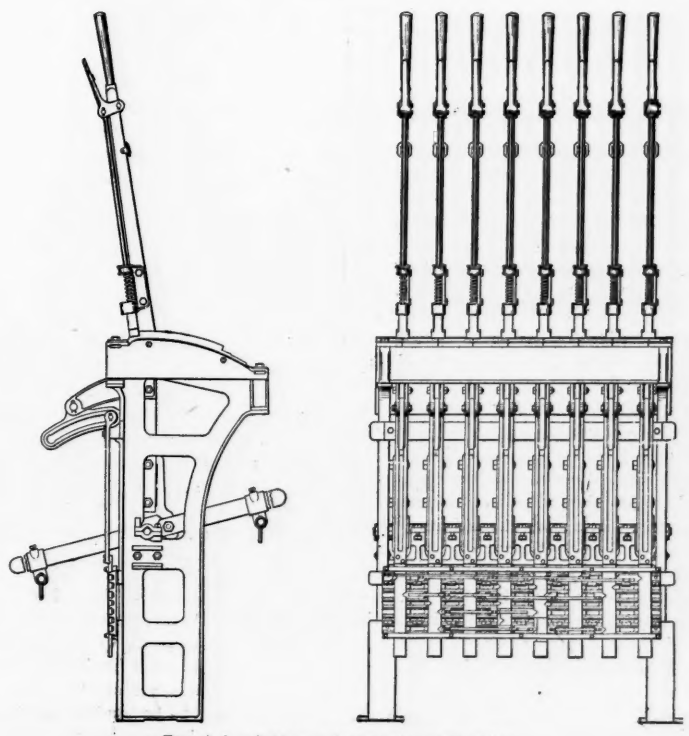


Fig. 1 A.—Johnson Interlocking Machine.

RAILROAD GAZETTE

ESTABLISHED IN APRIL 1856.
Published Every Friday.
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

In the passenger train which was wrecked by a collision at Apilly, France, on Sept. 9 (reported in the *Railroad Gazette* of Sept. 14), killing 12 passengers, there was an English engineer, whose account of the accident is noted editorially in *Engineering* of Sept. 21. This witness says that the train was fitted with the simple vacuum brake, and, "in accordance with the practice of the Northern Railroad of France," the valve for working the ejector was on the fireman's side of the locomotive, so that the engineman, when he sighted the obstruction, had to call to the fireman to apply the brake. The distance to the obstruction was only about 500 ft., however, and the Englishman says that in the car in which he was riding he did not hear the brake shoes grip the wheels. Moreover, the shock broke the train pipe, and the brake, being non-automatic, was then useless. But to make matters worse, the brakes on the engine and tender did take effect, there being a separate ejector for these, thus tending to crush the foremost passenger cars rather than the freight cars ahead of the engine. As *Engineering* well says, it is likely that the Westinghouse quick acting brake would have greatly mitigated the collision and perhaps have entirely prevented it.

Every one admits that freight must keep out of the way of passengers; the rule was made before most of us were born. But the railroad manager does not always find himself on the same side of the fence. In New York for the last few years the suburban passengers on the New York Central and the New Haven roads have complained loudly of delays at the Harlem River drawbridge, the offenders in most cases being freight boats which passed through the draw very slowly. The managers of these roads had to fight for their passengers in every way possible, of course; and now the drawbridge is to be raised about 20 ft. so that all boats without tall masts can go under it. On the other hand, a report from Boston shows that in a complaint of passengers down there the Boston & Maine has had to appear before the State Railroad Commissioners as an offender instead of a defender, the complainants being passengers on electric street cars from Somerville, Everett and Malden, who aver that they have to allow 20 minutes extra on their journey to Boston in the morning because the long and slow freight trains of the Boston & Maine keep them waiting at Main street and Rutherford avenue crossings in Charlestown. The trouble seems to be that the crossing is near a yard or terminal where long and heavy trains cannot be run at full speed, and the immediate occasion of the difficulty is the fact that the street cars carry a great many more people than they did in former times when drawn by horses. The ancient fashion of shutting your eyes and remaining ignorant of the details of your own business, until some one complains, seems to be still in vogue at Boston; for the chief officer of the road stated at the hearing that this misbehavior of freight trains, if it had occurred, was because "the company's attention had not been called to it."

Reports of railroad earnings now need particular study to enable us to obtain light on the business situation from a comparison with last year's earnings, for the latter were affected by the influences working in opposite directions and of varying relative importance in different parts of the country. On the one hand was the stagnation in business, substantially universal, which very greatly reduced freight earnings, and on the other the World's Fair travel, which on railroads leading to Chicago and within 500 miles or so of that city, was very greatly increasing passenger earnings. Both of these facts must be borne in mind. A railroad little affected by Chicago travel may show an increase in earnings now and still have very light ones; while some Chicago railroads may be doing very well now while earning less than last year at this time. What we are hoping for now is a turn in the tide—a greater activity in industry—and this will be shown by a growing freight traffic. Passenger traffic cannot become good until later. As few companies report monthly passenger and freight earnings, we are in most cases left to guess what changes are due to. This gives special interest to the August reports of the Chicago, Burlington & Quincy, which, while showing a decrease of $325,526 (32 per cent.) in passenger earnings, gained $135,231 (7.7 per cent.) in freight earnings. The August freight earnings are $129,000 (6.4 per cent.) less than in the corresponding month of 1892, it is true; but they are $283,000 (17½ per cent.) more than in 1891, and there has been no important increase in mileage since. This is an encouraging and perhaps a significant change; though later this road, more than most others, is likely to be affected by the disaster to the crops west of the Mississippi. Doubtless other railroads, especially Chicago railroads, are having their current earnings affected in this way; that is, a considerable increase in freight earnings this year is likely to be counterbalanced by a loss in passenger earnings. As signs of the times the freight earnings alone have great significance.

At last we have a clear and strong judicial utterance on "the right to strike." It is by Justice Harlan, of the Supreme Court of the United States, and the substance of it is printed in another column. Every one should read it. In accordance with the confirmed habit of the Supreme Court judges, Mr. Harlan, by his language, at every point excludes all considerations which would make this decision applicable to any case in the least different from the one under discussion, but nevertheless he grasps the question squarely, and his cogent statement at once brushes away a great amount of chaff with which many people, including some judges, have blinded their own eyes during the last year or two. Justice Harlan says, in substance, that the lower court commanded the employees of the Northern Pacific to remain in active service, whether-or-no; that this was violating the employees' rights and therefore the injunction, to this extent, was wrongfully issued; and that a number of persons may not combine or conspire to employ their united efforts to injure others, and, therefore, that the clause of the injunction forbidding the employees to combine or conspire to quit the service *with the object of crippling the property*, should stand. The plain implication of the paragraph from which we take these words, is that railroad employees may combine to assert their rights by peaceable methods; from which the inference is plain that if 100 or 1,000 employees, having a definite grievance, strike, peaceably, let the road alone, and refrain from the use of "wrongful methods" in persuading new men not to go to work, the only remedy of the road is a civil suit against the strikers. While thus giving every law-abiding employee all that he could possibly ask for, Justice Harlan sustains every word of Judge Jenkins' prohibition of the violence, intimidation and deception which have been so common in every large railroad strike of recent years. It will be observed that in speaking of "crippling the property" the present decision evidently means physical injury or restraint. If you make it necessary for the superintendent to hire a new man in your place, you do not cripple the property of the company, although many persons, using the words in a loose sense, have drawn the opposite conclusion. You may even make it impossible to run trains for awhile, but if you are peaceable and reasonable the law will not touch you.

In speaking on this subject last February (page 140) we said that, "For employees to meet secretly, when off duty, and agree to quit work simultaneously at the end of a day or of a trip, without notice, because their pay or their treatment is unsatisfactory, is universally agreed to be lawful (in the absence of any contract to the contrary). But for the men to plan to quit at such a time that the employer will have to do something more than get new men in their places, and to exaggerate grievances so as to over-persuade fellow employees, are generally reprehended as unlawful." The only change that it seems necessary now to make in these words is to qualify "universally agreed" and "generally reprehended" by adding the words "by all fair-minded and competent judges." The events of the past summer have called out a great many utterances, chiefly in the daily newspapers, on the subject of strikes; but with hardly an exception they have been tinged with partisanship sufficiently to deny one or the other of these assumptions. Those looking wholly at the rights of passengers have denied the right to peaceably strike. Those aiming to please "labor" alone, have taken great pains to defend the privilege of persuasion—with a slung shot in the hand. Justice Harlan clearly draws the line between these opposing views.

Recent Freight Movement.

The gross earnings of the railroads, which showed a gain in August as compared with August of last year, show a slight falling off in September. The fluctuations are small and a gain of 1 per cent. in August or a decrease of 2 or 3 per cent. in September is a very little matter compared with the prodigious losses with which we have become familiar through the year. The important fact is that these small changes come after the steady and great losses of the previous months, as for instance, a decrease in gross earnings of over 20 per cent. in July and over 21 in June. That there should be a decrease in September is not strange when we consider that in that month the passenger earnings of a few roads were immensely swollen by the World's Fair business and the earnings of a great many were substantially increased. So in looking over the tables of earnings for the weeks of September we may say in general terms that those roads most directly affected by the World's Fair traffic show losses this year as compared with last, while others more remote from the World's Fair territory continue to show gains. But it is interesting to everybody, not only to holders of railroad securities, but to those who have material to sell to the railroads, to know whether or not they are gaining in any important measure in the amount of material transported; whether or not the miles of idle freight cars are likely to be called into service soon.

From our weekly publications of the eastbound shipments of freight from Chicago by rail, not including live stock, we compile the little table below giving these shipments in thousands of tons for periods of four weeks, as follows (tons 1=1,000):

		1894.	1893.
Four weeks ending	May 19	213.4	223.4
" "	June 16	198.0	225.3
" "	July 14	103.4*	198.9
" "	Aug. 11	173.4	199.4
" "	Sept. 8	185.0	191.4
Three "	Sept. 29	157.8	152.5

* Interruption by strike.

It will be seen that in each period they were less than in 1893, except in the period of three weeks, including Sept. 29, when they had become greater. It will be seen also that there has been a steady growth in each period of the year 1894, since the strike. The total for the calendar year from Jan. 1 to Sept. 29 is not one per cent. less than for the same period in 1893. But 1893 was not a prosperous freight year; the total movement in that year was 12.6 per cent. less than for 1892.

The movement of freight west bound from New York by the Trunk Lines appears in the table below. It must be borne in mind that the quantities given are tons out of New York destined for the western termini of the Trunk Lines and not for intermediate places.

	1894.	1893.
First half year	648,368	783,218
April	106,385	147,571
May	116,616	130,023
June	120,635	110,387
July	106,917	96,461
August	126,532	103,756

Lake shipments from Chicago increased in the six weeks to Sept. 22 from about 47,000 tons to about 60,000 a week, and as lake rates have advanced a little this would seem to confirm the views of our Chicago correspondent that the charge of rate cutting by the railroads which have been made in some form about every week have but slight foundation. Judging from this item of eastbound freight from Chicago in the freight movement of the country it will appear that there is a small but encouraging growth.

An important group of railroads is affected by the movement of cotton and here we see an important increase over 1893. In the week ending Sept. 28 the total receipts of cotton at the seaports amounted to 202,221 bales. The preceding week the receipts were 145,547, and the week before that 85,884. From Sept. 1 to Sept. 28, 1894, the total was 472,048 bales, and in

the same period of 1893 it was 342,158 bales, an increase of 38 per cent. In the same period the receipts were over 16 per cent. more than in 1892. The receipts at interior towns from Sept. 1 to Sept. 28 were a little less than 370,000 bales, and for the same period in 1893 they were 266,000 bales; that is, an increase of about 40 per cent. These figures go all through the cotton movement and indicate greater prosperity for the Southern railroads as well as for the Southern people. In fact New York merchants tell us that the most important increase in sales for a good many weeks have been to Southern customers rather than to Western and Northwestern.

In flour and grain movements the very low price of wheat and the short corn crop conspire to make abnormal conditions, and we find that the receipts of flour and grain at the ten chief interior markets have been materially less than last year. The week ending Sept. 22 the flour received was 379,347 barrels against 440,582 barrels in 1893, but from Aug. 1 to Sept. 22 the receipts of flour were slightly greater than in 1893. The receipts of wheat were 5,780,000 bushels against 5,982,000 in the preceding year, and 8,581,000 in the same week for 1892; but for the period from Aug. 1 the receipts of wheat were 46,158,000 bushels and in 1893 they were 32,248,000. In 1892 they were 59,363,000. The receipts of corn were a little over two million bushels as compared with 4¾ millions in 1893, and about three million in 1892, this for the week. For the period from Aug. 1 the receipts of corn were, in millions of bushels, 12.9 in 1894, 25.7 in 1893 and 18.8 in 1892. The receipts of oats vary in the same way but to a less degree; that is, for the week they were in millions of bushels 2.4, 4.0 and 3.0 in the years under consideration, for the week; and for the period since Aug. 1 they were 21.8, 25.3 and 22.1. At seaboard ports the receipts of flour and grain in recent weeks have compared as below.

Week ending Sept. 22:

	1892.	1893.
Flour, bbls	441,089	400,064
All grain, bushels	4,294,000	5,084,000

Jan. 1 to Sept. 22:

	1894.	1893.
Flour, bbls	14,528,000	13,683,000
All grain, bushels	110,177,000	151,149,000

These figures do not indicate any movement that will tax the capacity of the railroads; nor do those of coal movement given below. The weeks immediately following the strikes were marked by a lively shipment of coal, to fill up exhausted stocks and some of the roads were short of cars. Even now we hear that shipments are delayed for want of cars in a few instances, but such complaints are not at all general. The tables give the anthracite shipments and those of bituminous from the chief Eastern fields.

ANTHRACITE SHIPMENTS—TONS (1 = 1 000).

	1894.	1893.
Week to Sept. 1	769	639
" " 8	636.1	739.3
" " 15	751.4	837.3
" " 22	846.3	930.1

Year (1 = 1,000,000).

Year to Sept. 1	26.1	27.7
" " 8	26.7	28.5
" " 15	27.7	29.3
" " 22	28.6	30.2

BITUMINOUS SHIPMENTS—TONS (1 = 1,000).

	1894.
Week to Sept. 1	389 8
" " 8	277.1
" " 15	401.4
" " 22	324.5

Year (1 = 1,000,000).

	1894.	1893.
Year to Sept. 1	8.9	13.6
" " 8	10.8	15.7
" " 15	11.3	16.1
" " 22	11.6	16.5

The settlement of the coke strikes was followed by a very important increase in furnace capacity during the month of August which added a large tonnage in coke, ore and pig iron to the traffic of a number of railroads. On the first of September the *Iron Age* gave the total weekly capacity in gross tons of the furnaces then in blast as 151,113. Aug. 1 the capacity was 115,356, July 1, 85,950. In fact the capacity of the furnaces in blast on the first of September was greater than it had been at any time since July 1, 1893. The anthracite furnaces had shared in this increase of capacity, but not in nearly as great percentage as the coke furnaces. This increased volume of product is an element of considerable importance, but there is nothing in the more recent accounts to indicate that it is likely soon to be further increased or that prices will be materially advanced. That is, we may be pretty certain that the iron and steel business is not to have a boom at present.

Therefore, looking over the whole field, the most that can be said is that the railroads can expect only a moderate fall business, and it does not seem likely that the results for some time will differ widely from those of last year.

The New York Central Report.

To most of us, doubtless, the impressive fact in the report of the New York Central & Hudson River Company for its fiscal year ending with June last, is the decrease of $3,258,493 in its gross earnings. So great a loss, it seems, could hardly have occured except from catastrophe. But we must remember that this is a great company, and that all figures concerning its capital and income are very large; and examinations show that this very large amount was after all not quite 7 per cent. of the previous year's earnings; and a great many of us have suffered as large a decrease in income as that without being conscious of anything catastrophic in our business. And in fact the New York Central has fared better than many other rail roads in the period of depression, as it usually does, having a traffic less liable to violent fluctuations than, for instance, one largely made up of coal, ore, iron and kindred articles. For example (an extreme case), in this same year, while the New York Central lost $3,258,000 in gross earnings, the Pennsylvania, east of Pittsburg and Erie, lost no less than $11,293,816. But the Pennsylvania is still more gigantic than the New York Central, and we shall compare them fairly only when we say that while the Central's decrease was 7 per cent. the Pennsylvania's was 16 per cent. And the Erie in the last half of the fiscal year alone (the first half of the calendar year) suffered a loss of 21½ per cent., amounting to $3,109,301, or nearly as much as the New York Central's loss for the whole year. Thus, comparatively speaking, the Central's business was well maintained.

Substantially, the whole decrease was in freight earnings, and in spite of the World's Fair travel the passenger earnings remained almost unchanged, the increase being but $107,708, or only ¾ of 1 per cent. The World's Fair, it must be remembered, killed a great deal of travel, as well as created a great deal. There actually was *less* travel on this road in 1893-1894 than in the previous year—fewer through passengers, fewer way passengers, and less passenger milage—very slight decreases, it is true, but decreases nevertheless. This is not so mysterious as it might appear to those of us who have the impression that pretty much all the world lives east of Buffalo, and who know that an unusually large proportion of these Eastern people went to Chicago last year. It so happens that there is a very considerable population west of Buffalo, and that in ordinary years the number of Western people visiting the East is much greater than the number of Eastern people visiting the West. Last year the Western people had something more attractive than the East to visit, and by far the larger part of those who would otherwise have gone to New York or New England went to Chicago instead; while since the Fair (and eight months of the fiscal year came after it closed) both Eastern and Western people have stayed at home more than usual; many because they had just spent their travelling money at the Fair, and many more because their incomes had been reduced by the hard times.

The decrease in freight earnings was $3,267,561, or nearly 12 per cent., and this was due wholly to a decrease in traffic; for the average rate received was higher than in the previous year (0.74 cent per ton-mile, against 0.71 cent.) The freight reported as "through," which we take to include that interchanged at Albany as well as that to and from New York, decreased just one-fifth in both directions; the way freight nearly 11 per cent. and the total traffic ton-mileage no less than 14½ per cent.—a very serious change indeed. A great disaster to crops sometimes results in such a loss; in this case the loss is evidently due to a derangement in other industries; for the number of tons of flour, grain, live stock and provisions and other farm produce was 6,261,367 tons last year, against 6,745,327 the year before, nearly everything increasing except grain, which in 1892 had probably been diverted from the canal by unprofitably low rates. In other freight the decrease was from 14,566,745 to 11,983,225 tons—no less than 18 per cent.; and such decreases as 12½ per cent. in lumber, 28 per cent. in manufactured iron, 16½ per cent. in coal and 16 per cent. in "merchandise" reflect the great disturbance in manufacturing industries and decrease in consumption.

The past year having been one in which a development of traffic was impossible, the railroad managers gave special attention to the expense accounts, with astonishing results, as we have seen in many cases of late months. And the reports of expenses probably attract more attention from investors and others than at any other time. If they will persist in scrutinizing them when prosperity returns, it will be well for all concerned.

Now the New York Central shows a reduction in expenses in the last year amounting to $2,783,471, or 8.6 per cent., of which we may say, as of the gross earnings, that it is a vast sum and equal to three-fifths of the dividends paid, but not (for these days) an extraordinary percentage. The gross sum, however, offers little opportunity for criticism. Details are necessary for a judgment; and these are offered with unusual completeness in the New York Central report, which gives the expenses not only under the usual five general heads, but in 101 items, so that any great or small change can be located. Just about half of the total decrease in expenses is in traffic expenses (5.8 per cent.), motive power other than maintenance, general expenses (11 ½per cent.), and taxes (8 per cent.). The other half is in maintenance expenses, in which there is a decrease of 16.4 per cent. for maintenance of cars, 15 per cent. for maintenance of way, and less than 6 per cent. in repairs of locomotives. The very large items of decrease in maintenance are $396,000 (22 per cent.) for freight car repairs, there having been a decrease of 14½ per cent. in freight traffic, and $353,000 (55½ per cent.) for steel rails. Track repair labor cost but 2.2 per cent. less than the year before, and there was an increase of 12 per cent. in expenditures for cross-ties.

A comparison of the maintenance expenses is not so simple a matter as it may seem. The property is not stationary, but changes in length of road and quantity of equipment from year to year. The best we can do is to take the number of cars and locomotives and miles of track every year and compare them with the expenditures upon them. Thus for the last four years we have

	1891.	1892.	1893.	1894.
No. locomotives	1,132	1,169	1,197	1,211
Locomotive repairs	$1,048,586	$1,420,606	$1,555,377	$1,418,353
Average per locomotive	925	1,215	1,299	1,171

The average per locomotive is the nearest test; but it does not cost as much to keep idle locomotives in repair. The train mileage was nearly the same in 1894 as in 1893, 1¾ per cent. less than in 1892, and nearly one-fourth of one per cent. more than in 1891. The decrease in expense per locomotive is 10 per cent. from 1893 and 3½ per cent. from 1892.

The number of freight cars and the cost of their repair has been:

	1891.	1892.	1893.	1894.
No. freight cars	45,588	40,206	40,172	39,302
Repairs of freight cars	$1,057,848	$1,316,903	$1,807,946	$1,411,649
Per car	26	33	45	36

It will be noticed that there has been some decrease every year in the number of freight cars; but it does not by any means follow that the capacity or the cost of the freight equipment has diminished. For many years of all or nearly all new cars have been of large capacity, generally 30 tons on this road recently, taking the place of old cars which carried 10 to 20 tons. Probably few 10-ton cars have been left on the New York Central proper for some years; but some of the recently leased lines probably had some.

The figures for repairs do not include shop and superintendence expenses, which for both classes of cars are about 25 per cent. of the charges called "repairs." Even allowing for these, the cost per car seems exceedingly small in all the years; but it was larger last year than in any other except 1893, when apparently the number renewed was unusually large.

The number of passenger-train cars and the cost of repairing them have been:

	1891.	1892.	1893.	1894.
No. passengers cars	1,199	1,307	1,427	1,488
Repairs passenger cars	$494,990	$638,517	$753,959	$630,316
Per car	412	488	528	424

The cost per car was doubtless much more than the average in 1892-93, when the company was making preparations for the Fair travel. The passenger traffic, has been 597, 687, 745 and 742½ millions of passenger miles for the four years successively.

Maintenance of way expenses we compare with the mileage of track rather than of road. They have been:

	1891.	1892.	1893.	1894.
Miles of track	4,752	4,808	4,857	5,214
Maintenance of way	$2,630,545	$2,927,627	$3,229,715	$2,530,929
Per mile	553	609	665	485

The acquisition of roads of light traffic last year tended to bring down the average cost per mile, and besides, one of these roads was worked only for part of the year.

The total amount paid to employees decreased $850,226, or less than 5 per cent., and the average number of men employed fell from 27,732 to 27,088, or 2⅓ per cent., while the average annual payment per employee was $607, against $623,—a decrease of 2⅔ per cent. Certainly the working force must have fared much better than the average workman in most other employments. Wages were 55⅔ per cent. of the total expenses, and absorbed just about three-eighths of the gross earnings.

Just as the annual report appears, the company has

issued a statement of the earnings and expenses for the first quarter of the new fiscal year. Coming just before the quarter closed, the amounts are partly estimated. The decrease in gross earnings is $1,290,000, or more than 10 per cent., while for the year it had been 7 per cent.; but it is nearly offset by a decrease of $1,084,000, or 13 per cent. in the working expenses. This continued large decrease in earnings is not very encouraging, and it seems to have been larger in September than in August. But this is just the time when the Fair travel was heaviest; and a comparison of freight earnings would doubtless be more favorable; and it is the freight earnings which indicate the condition of the country's business.

August Accidents.

Our record of train accidents in August, given in this number, includes 52 collisions, 89 derailments and 9 other accidents, a total of 150 accidents, in which 50 persons were killed and 136 injured. The detailed list, printed on another page, contains accounts only of the more important of these accidents. All which caused no deaths or injuries to persons are omitted except where the circumstances of the accident as reported make it of special interest. These accidents are classified as follows:

COLLISIONS:	Rear.	Butting.	Cross- and other.	Total.
Trains breaking in two	6	0	1	7
Misplaced switch	2	1	2	5
Failure to give or observe signal	2	0	0	2
Mistake in giving or understanding orders	0	3	1	4
Miscellaneous	5	3	3	11
Unexplained	11	5	7	23
Total	26	12	14	52

DERAILMENTS:			
Broken rail	2	Bad switching	2
Loose or spread rail	1	Animals on track	10
Defective bridge	3	Landslide	5
Defective frog	1	Maliciously misplaced switch	2
Broken wheel	2	Malicious obstruction	8
Broken axle	13	Accidental obstruction	2
Loose wheel	1	Unexplained	30
Failure of drawbar	1	Total	89
Broken push-pole	1		
Misplaced switch	4		
Track repairers	1		

OTHER ACCIDENTS:		
Broken side rod	2	
Cars burned while running	2	
Various breakages of rolling stock	1	
Other causes	4	
		9
Total number of accidents		150

A general classification shows:

	Collisions.	Derailments.	Other ac'd'ts.	Total.	p.c.
Defects of road	0	7	0	7	4
Defects of equipment	7	18	3	28	19
Negligence in operating	22	7	2	31	21
Unforeseen obstructions	0	27	4	31	21
Unexplained	23	30	0	53	35
Total	52	89	9	150	100

The number of trains involved is as follows:

	Collisions.	Derailments.	Other ac'd'ts.	Total.
Passenger	18	21	5	44
Freight and other	80	69	4	153
Total	98	90	9	197

The casualties may be divided as follows:

KILLED:	Collisions.	Derailments.	Other ac'd'ts.	Total.
Employees	10	15	0	25
Passengers	0	10	0	10
Others	2	8	5	15
Total	12	33	5	50
INJURED:				
Employees	41	44	9	94
Passengers	9	14	0	23
Others	0	15	4	19
Total	50	73	13	136

The casualties to passengers and employees, when divided according to classes of causes, appear as follows:

	Pass. killed.	Pass. injured.	Emp. killed.	Emp. injured.
Defects of road	0	0	3	6
Defects of equipment	2	0	0	7
Negligence in operating	0	9	10	48
Unforeseen obstructions and maliciousness	8	10	11	15
Unexplained	0	4	1	18
Total	10	23	25	94

Twenty-five accidents caused the death of one or more persons each, and 38 caused injury but not death, leaving 87 (58 per cent. of the whole) which caused no personal injury deemed worthy of record.

The comparison with August of the previous five years shows:

	1894.	1893.	1892.	1891.	1890.	1889.
Collisions	25	50	94	111	85	81
Derailments	89	90	119	110	82	82
Other accidents	9	7	8	2	11	6
Total "	150	147	221	223	178	169
Employees killed	25	28	35	36	65	28
Others "	25	38	15	55	35	23
Employees injured	94	67	104	152	196	122
Others "	42	95	109	189	96	131
Passenger trains involved	44	55	68	92	66	66
Average per day:						
Accidents	4.84	4.74	7.13	7.19	4.74	5.45
Killed	1.61	2.13	1.61	2.94	3.23	1.64
Injured	4.59	4.94	8.69	11.00	9.42	8.16
Average per accident:						
Killed	0.333	0.449	0.226	0.408	0.562	0.301
Injured	0 907	1.041	0.964	1.529	1.640	1.496

The number of fatal inj ries to passengers in August was 10. Eight of these passengers were killed in the distressing disaster at Lincoln, Neb., on the 9th, which seems to be a parallel to the Statesville (N. C.) disaster of 1891, except in the number of victims. A negro was arrested at Lincoln and held for trial, but no result of the trial has yet been reported. The other two passengers killed were not in passenger trains. The number of tramps and others killed is again large. Our readers are familiar with the recent statements of the very large number of men stealing rides on the freight trains of the Pennsylvania Road. The same conditions prevail everywhere East and West, the number of tramps in thinly settled districts being perhaps even greater in proportion to the population or the number of trains than in the eastern states. In the derailment at Jonesburg, Mo., on the 19th, 3 tramps were killed and 6 injured.

There were two very costly disasters to oil trains in August, one at Bucyrus, O., on the 3d, and one at Cheektowaga, N. Y., on the 18th. Each of these cases was reported in the newspapers as caused by the train breaking in two, but, as will be seen by our accounts, this is not the cause assigned by the officers of the roads interested. A third accident, due to the presence of inflammable oil, was that at Pittston, Pa., on the 2d. The ignition of oil or its gases, in case of collision or derailment, can be certainly prevented only by preventing the collision or derailment, but the Pittston case was evidently due to the accumulation of gases which had leaked slowly, which suggests that such commodities ought *always* to be carried in stock or open cars. Another freight train accident in which fire did great damage was that at Anderson, Pa., on the 24th.

The train despatcher who gave conflicting orders, causing the collision near McMillan, Wash., on the 10th, was tried in a justice's court, but was released, the court holding that no criminal negligence was shown. The collision at Worcester, Mass., on the 18th, is an illustration of country methods in a large city. The road has a large number of interlocking plants and its policy as regards signaling is generally enlightened. The whole line from Boston to Springfield is equipped with automatic block signals with the exception of a very few places, but one of these few seems to be the point where this collision occurred; an important station where passenger train movements are very frequent; yet the protection of a passenger train in this case was a red hand lantern left standing upon the track without an attendant.

The record of trains breaking in two and other failures of couplings shows no signs of abating. Among the cases this month is one where a drawbar, which dropped upon the track, did not derail any of the cars of that train, but threw off the engine of a following train.

In Chicago, on the 6th, a horse car was struck by a freight train and two passengers badly injured, the accident being partly due to the freight train breaking in two. There was a gateman at the crossing, but he failed to observe after the passage of an engine and freight cars that another string of cars was following. On the 29th, in the same city, an electric car collided with a passenger train of the Chicago & Northern Pacific, injuring three of the occupants of the street car. In Minneapolis, on the 26th, three men were injured in an electric car which was struck by a locomotive of the Northern Pacific. Near Wheeling, W. Va., on the 5th, an electric car struck a wagon on the Whisky Run Bridge, while going at full speed, and knocked it off the bridge and to the ground 20 ft. below. Eight of the occupants of the wagon were seriously injured. At Hazleton, Pa., on the 9th, a collision of electric cars resulted in the injury of 10 passengers. Near Hazel, Ky., on the 22d, five persons in a wagon were killed by a train of the Paducah, Tennessee & Alabama.

The Railroad Bond Market in September.

The railroad bond market in September reflected the exceptionally large accumulation of idle money here and in Europe, the revival in general business, the improvement in earnings, and the declaration of regular dividend by the leading railroads—the Rock Island alone excepted. The consequence was a fair bond market, which was more active in the first part of the month, particularly in the more speculative issues. This class toward the close showed a reactionary tendency, but the demand for high class bonds was in excess of the supply. Fewer loans in the municipal bond market were offered than in the previous month and prices were well maintained.

The completion of the reorganization of the Richmond Terminal system was followed by advances in the securities of the successor company. On the other hand the publication of the Olcott-Earle reorganization plan for the Reading Railroad system, was followed by a sharp decline, attributed by some people to the quiet but uncompromising hostility of powerful interests. The preference income bonds of the company were the chief sufferers. Atchison securities were also weak, and of them London was a seller. Toward the close of the month the course of Oregon improvement issues indicated realizing on bonds bought previously, on the showing of good earnings. Among the strong bonds were the securities of the East Tennessee, Virginia & Georgia, which have been favorably affected by the satisfactory treatment which they receive in the reorganization. Toledo, Ann Arbor & North Michigan issues have been supported on the impression that a reorganization of the property will soon be made. The bonds of the Chicago Trunk Lines have been fairly active and higher, but the trading has been chiefly in small lots. Rome, Watertown & Ogdensburg, and St. Louis & Iron Mountain 5's were helped in price as the October interest date approached. Southern issues have shown strength on the continued favorable exhibit of earnings, and there has been some trading in Peoria & Eastern incomes and first mortgage bonds. There seems to be an impression that Northern Pacific 3rds are too high when the amount of receivers' certificates ahead of the firsts and seconds is considered.

The average changes by groups is given in the table which follows:

Receivership group declined	.01
Grangers group, advanced	.32
Trunk lines advanced	.70
Southwestern advanced	.15
Transcontinental advanced	.83
Coalers advanced	1.02
Southern advanced	2.42
Miscellaneous advanced	.37
Combined list advanced	.72

The sharpest advances occurred in the bonds of southern and anthracite coal railroads, and the greatest activity was in Reading general mortgage 4's, Rock Island extension 5's, debenture 5's, Richmond Terminal 5's and Texas & Pacific 2nds in the order named.

The October disbursements for interest on the bonds of railroads and other corporations, and the Government payments of interest, are estimated at $40,000,000; and the bond investment houses look for a large reinvestment of these payments in securities of the various grades. Even the defaulted issues have found friends. No important new defaults in interest were reported on October 1.

The sales of active bonds during September, par value, were as follows:

	Par Value.
Atchison 4s	$957,000
Atchison 2nds "A"	472,000
Austin & Northwest 1st	132,000
Chesapeake & Ohio cons 5s	122,000
Chesapeake & Ohio gen. 4½s	680,000
Chesapeake & Ohio E. & A. 1st cons. 4s	255,000
Chicago & Northern Pacific 5s	214,000
Denver & Rio Grande 4s	124,000
East Tennessee gold 5s	183,000
East Tennessee Equip 5s	252,000
Houston & Texas Cent gen. 4s	162,000
Kansas & Texas 4s	516,000
Kansas & Texas 2nds	621,000
Missouri, Kansas & Eastern 1st	196,000
Missouri, Kansas & Texas 5s	308,000
Northern Pacific 2nds	184,000
Northern Pacific 3rds	335,000
Northern Pacific Cons. 5s	952,000
Northern Pacific Col. Tr. notes	396,000
Oregon Short Line 6s	207,000
Oregon Improvement con 5s	505,000
Richmond Terminal 6s	469,000
Richmond Terminal 5s	1,594,000
Rock Island Ext. 5s	174.000
Rock Island Deb. 5s	173,000
Reading Gen. 4s	1,971,000
Reading 1st incomes	694,000
Reading 2nd incomes	569,000
Reading 3rd incomes	654,000
Reading Deferred incomes	205,000
St. Louis Southwestern 1sts	386,000
St. Louis Southwestern 2nds	239,000
San Antonio & Aransas Pass 4s	173,000
Southern Railway 5s	241,000
Texas & Pacific 2nds	947,000
Union Pacific 1st, 1898	171,000
Wabash 1st	332,000
Wabash 2nds	289,000
West Shore guaranteed 4s	297,000
West Shore guaranteed 4s, reg	286,000
Western New York & Pennsylvania 2nds	192,000

The changes in prices are shown in the table herewith.

The table of "Employees and Salaries" in the last New York Central report gives some information which will be interesting probably to the layman as well as to the railroad man. The average number of seventeen different classes of employees is given, with the aggregate compensation paid each class. This enables us to ascertain the average pay per man per year in each class. Beginning at the top, which every ambitious candidate for brakeman aims to reach, the New York Central last year had 69 "general officers," with the comfortable average salary of $6,030 each. The year before there were but 62, but they averaged $6,311 apiece. Next in earnings come the locomotive engineers, 1,350 of whom last year earned an average of $1,220 each. There were 79 more the year before, but they earned only $1,202 each then. Conductors come next with $981 apiece last year and a dollar more the year before. The general office clerks average $808 each, and next come the "employees on floating equipment" with $704, who are railroad men because a railroad company pays them. "Mechanics and helpers on road," got $664 each, and next come "firemen and wipers" with $646. Station agents get $633, and trainmen other than engineers, firemen and conductors, which must mean brakemen and baggagemen, also $6 Roadmasters and track foremen average $609, telegraph operators an even $600. "Other station-men" (not agents nor telegraphers) average $565; "mechanics and helpers in shops" $523; switchmen, flagmen and watchmen, $500; shopmen other than the "mechanics and helpers" above mentioned, $460; trackmen, $419. The most numerous class are the 5,314 "other stationmen," mostly freight handlers, probably. Next come the 4,379 trackmen, 3,516 mechanics and helpers in shops, and 2,523 switchmen, flagmen and watchmen. Of trainmen of all kinds there are 5,487. Curiously, there is a considerable increase in the number of shopmen, though generally a decided decrease in the shop work, judging by the expenditures for repairs of rolling stock.

It is announced at New Orleans that the Southern Pacific is to run a train through, once a week, between that city and San Francisco in 77 hours, or about 24 hours quicker than the regular daily through train. The train is to begin running on Nov. 1 and will leave New Orleans every Thursday morning, the train in the opposite direction starting from San Francisco at the same time. It is said that the cars are all new and vestibuled, and equal to the best in beauty and finish. Two-thirds of the sleep-

ers are compartment cars. It is fair to assume that the company, in putting on these trains, aims to accommodate the public and to make a little money; weekly trains of this kind have been run to Mexico and to the Pacific Coast in previous years, but the New Orleans reporter, naturally looking out for his own city, learns that one of the chief objects of the company is "to give New Orleans a lift." That city is "a garden spot for the hunter of curios, the historian, the novelist and everybody." Moreover, it is on the most direct route from the East to the West. It appears that people who have neglected New Orleans may have been led into their error by an exaggerated view of the importance of other cities. Says the representative of the Southern Pacific:

"Why, look at Chicago. What is there in that town to attract the visitor, aside from a ride along the lake, a look at the tall houses, and, perchance, a visit to the spot where the cow kicked over the lamp and destroyed the city? Nothing. You can see the whole town in 24 hours. But in New Orleans we have enough of interesting things to keep a visitor several months."

Detroit grain shippers are again getting the worst of it in their competition with Chicago for Eastern business. Rates out of Chicago are being cut, while in Detroit there is no corresponding reduction. The trouble is, and has for some time been, that Detroit railroad men are honest while those in Chicago are not. In Chicago they violate the interstate law every time it appears in the way of getting business. In Detroit there is not a man who would even think of doing so great a wrong, no matter how much business might depend on such action. Chicago rates are demoralized, while those of Detroit are firm. This shuts Detroit grain men out of all the Eastern markets, for the margin of profit is so small that a small concession in freight rates controls the business. If Detroit and Chicago railroad men were equally honest or equally dishonest there would be nothing to complain of, but the way it now stands Detroit, through the integrity of her railroad men, is shut out in the race for business. —*Detroit Free Press.*

We like to see our esteemed contemporary take a cheerful and philosophical view, but we fear there will still be something to complain of after the standard of honesty has been brought to a uniform level. Chicago has twice or three times as many railroads as Detroit to bid for each shipment of grain for the East. When there are from 6 to 20 agents trying to get a contract the price is going to be pretty low, howsoever honest the men may be. And some of the roads leading out of Chicago are more likely to starve to death if they fail to get grain to carry, than any Detroit line is. The Detroit agent is like the dog, running for his dinner; the Chicago man like the fox, running for his life.

On August 19, the Jacksonville, St. Augustine & Indian River road ran an excursion train, which was probably one of the heaviest passenger trains ever run. The fact has been generally published in the press despatches, so that it is now no news to most of our readers, but we have only just received authentic information as to the weight and size of the train, and we will note it for the benefit of future historians, and of news gatherers, who make a specialty of "record breaking." The train ran from Jacksonville to St. Augustine, 38 miles, and it was made up as follows:

25 passenger cars, weighing 49,050 lbs. each	1,226,250
1 baggage car	44,650
1,500 passengers	225,000
	1,495,900

Or, say, 748 tons for the total weight of the train behind the tender. The engine was made at the Schenectady Locomotive Works and weighed, with tender, about 80 tons. The run was made in 1 hour and 18 minutes, or at the rate of 29.2 miles an hour. We do not know the precise grade of the road, but the maximum grade is 52 ft. per mile. Presumably this rate prevailed for a short distance only. According to the figures given, the 26 cars, with their load, weighed about the same as a train of seventeen 14-ton freight cars carrying a load of 30 tons each.

TRADE CATALOGUES.

Heaters.—Messrs. L. Schutte & Co., Philadelphia, have issued a pamphlet of eight pages, describing their noiseless heater. It gives a description of their latest appliances for heating water by direct steam; also tables of capacities of different sizes and other particulars for application and operation. Air is mixed with the steam, preventing the sudden collapse of bubbles and consequent noise; and it is claimed that the apparatus is noiseless at any pressure from 5 lbs. to 100 or more.

Compound Locomotives.—Richmond Locomotive & Machine Works. Richmond, Va.

The Richmond Works issue a pamphlet giving very good illustrations of the special mechanism of their compound locomotives, photographs of two 10-wheelers built for the Chesapeake & Ohio, one a simple and the other a compound, and complete tables of weights and dimensions of these two engines. Other tables give particulars of the performances of 10 simple engines and one compound, giving mileage, cost of repairs, fuel consumption and a good deal more data. The compound shows superior efficiency and economy in every particular. Photographs are also given of a 10-wheel compound and a 10-wheel simple expansion built for the Cleveland, Cincinnati, Chicago & St. Louis; and a table is printed of the performances of this compound and 16 simple engines of the same class on that road. The results are similar to those on the Chesapeake & Ohio.

PRICES OF RAILROAD BONDS IN SEPTEMBER.

	Highest.	Lowest.	Last Sales.	Changes from Last Sale in August.
Roads in Receivers Hands.				
Atch., Top. & S. Fe 4s	73	70¾	70⅞	− 2⅛
" " " 2nds A	25½	22¼	22¾	− 2¼
Colorado Midland 4s	26	25	26	+ 1
Atlantic & Pacific 4s	45¾	44	44	−1⅝
East Tennessee 1sts	114½	11.3⅛	114½	+ 1½
" " con. gold 5s.	105	103¾	104⅝	+ ⅜
" " equip. 5s	88	81½	87½	+ 5¼
Erie 1sts, cons. gold	133½	132	133	+ ¾
" 2nds	77	75	76	+ ¾
Northern Pacific 1sts	112½	112	112⅛	+ ½
" " 2nds	89⅞	87⅞	88	+ 2
" " 3rds	64¼	62	63	+ 1
" " con. 5s	33	29½	29½	− ¾
Nor. Pac. Col. Tr. notes	80	78	78	− 1¼
Northern Pac. & Mon. 1sts	39	36	37	+ 5
Chicago & Nor. Pac. 5s	46	42½	42½	− 3½
Wisconsin Central 1sts	59½	57¾	58½	− ½
Seattle, L. S. & Eastern 1sts.	52	50	52	+ 2
Reading G. M. 4s	80⅝	77½	77½	− ⅝
" 1st incomes	37	32½	32½	− 4
" 2nd incomes	26	21¾	21¾	− 4
" 3d incomes	21¼	17	17½	− 3
" deferred	5⅞	4¼	4¼	− 1½
Rich. & W. P. T. 5s	35⅜	32¼	33½	+ 1⅜
" " " 6s	70¾	66	68¾	+ 1¾
Rich. & Danville 1sts	117½	115½	117½	+ 1½
Savannah & West. 1st	52½	51	51½	
Union Pacific 1st 1896	105¼	104¾	105¼	+ ¼
" " " 1897	106⅜	105¼	105¾	
" " " 1898	107	106	106⅛	+ ⅛
" " " 1899	108	107	108	+ 1
" " gold note 6s	90	88	89	− 1
" " sink. fund 8s	99	96	96	
Atch., Col. & Pac. 1sts	40½	38	38	− 1
Kan. Pac. con. 6s	86¾	80	80	− 4½
Ore. Nav. 1st 6s	108	107⅛	108	+ 1¾
" " con. 5s	75	72½	75	+ 3
Oregon Short Line 6s	87½	84	84½	− 2½
U. P., D. & Gulf 1sts	41	39	39	− 1
Ft. Worth & Den. City 1sts.	77	72¾	72¾	− 3¼
W. N. Y. & Penn. 1sts	103¼	102	103¼	+ 2
" " " 2nds	25¾	24¼	24¼	− 1½
Toledo A. A. & N. M. 1sts	80	74	80	+ 3
Toledo A. A. & G. T. 1sts	81	78	80	+ 2
Tol. A.A. & Cad. 1sts	68¾	65	68¾	− 2¼
Tol.,St. Louis & Kan.City 1sts	62½	57½	61	+ 3½
Average decline, $0.01.				
Grangers.				
Chic., Bur. & Q. 7s	121⅝	120⅞	121⅜	+ ½
" " " deb. 5s	100	98	99½	+ ½
" " " conv. 5s	102	101	101⅞	− ⅛
" " " Neb. ex. 4s.	89½	88⅝	89	− ⅜
St. Paul, 8's	113¼	113	113¾	+ ¾
" " cons. 7s	129½	128½	129½	+ 2½
" " Chic. & P. W. 1st 5s.	111½	109½	110½	+ 1¼
" " South Minn. 1sts	115	114	115	
" " Dak. & Gt. So., 5s.	105¾	104	105¼	+ 1½
" " Southwest div.	114½	113	114½	+ 1⅜
Rock Island 6s	128	127¼	127¾	+ 1
" " Ext. 5s	101½	100¼	100⅝	− ⅜
" " Deb. 5s	90	88½	89	− ¼
Northwest cons 7s	141	140	140½	
Average advance, .32.				
Trunk Lines.				
Penn. 4½s	111	110¼	110¾	
P. C. C. & St. L. 4½s "A"	106½	105	106¼	+ 1
Mich. Cen. 1st	123	122½	123	+ ½
N. Y., Chic. & St. L. 4s	102	101⅓	102	+ ⅔
N. Y. Central 1st 7s	127½	126¼	126¾	− ¼
" deb. 5s	108	106½	108	+ 1½
Rome, Wat. & Ogd. Ext. 5s	119	116½	119	+ 2½
Beech Creek 4s	104	103½	104	+ ⅝
West Shore guar. 4s	105	103¾	104⅝	+ 1
Average advance, .70.				
Southwestern.				
Int. & Gt. Northern 1sts	113¾	112½	113½	+ 1⅜
" " 2nds.	67½	66¾	67½	+ 1¾
Kan. & Texas 4s	80½	79¾	80⅞	+ ⅝
" " 2nds	45½	42	43	− ¾
Mo., Kan. & East 1sts	81¾	81	81¼	− ¼
Mo., Kan. & Tex. of Texas 5s	75	73	73	− 4½
Iron Mountain 5s	83¼	79	82	+ 3
Pac. R. R. & Mo. 1sts	99⅞	98¾	99⅝	+ ⅜
St. Louis Southwestern 1sts.	60½	57½	58¼	− 1¼
" " 2nds.	20	18	19	+ ⅛
Texas & Pacific 1sts	87¾	87	87½	
" " 2nds	28	25	25	− 2½
Wabash 1sts	106	104½	104½	− ⅞
" 2nds	73¼	67¼	67½	− 5½
" deb. B	27¾	26½	27	+ 2
" Det. & Chic. ext.	99	98	99	+ 1
Hous. & Tex. Cent. 1sts.	105	103½	105	
" " gen. 4s	66½	63¾	65½	+ 1⅝
Average advance, .15.				
Transcontinental.				
Den. & Rio Grande 4s	80	79⅛	79¾	+ ¼
Rio Grande West 4s	67	66	66¼	− ¼
St. Paul M.&M. Mon. Cen. 6s	112	110¼	110½	− ½
So. Pac. of N. Mex. 1st	100½	97⅞	100½	+ 2⅝
So. Pac. of Cal. 1st con. 5s	92¼	91	92	+ 1
Northern R. R. of Cal 5s	94½	91½	94½	+ 1⅝
Average advance, .83.				
Coalers.				
Jer. Central gen. 5s	117	116	116¾	+ ¼
Lehigh & Wilk. con. ass'n.	109¾	107	109¾	+ 1¼
N. Y., Ont. & West. ref. 4s	87	86¼	87	+ ½
" " " con. 5s	110¾	109¾	110½	
N. Y., Sus. & West. ref. 5s	105⅛	104¼	105⅞	+ ⅛
Average advance, 1.02.				
Southern.				
Lou. & Nash. gold 4s	79⅛	78⅝	79⅛	+ ⅜
" " N. O. & M. 1sts	120	117	119½	+ 5½
" " Pen. & At. 1sts	102⅞	98	102⅞	+ 1⅛
" " S. & N. A. 5s	94	91¾	94	+ 4
Nash.,Chat. & St.Louis 1st	130½	130	130¼	+ 2¼
Scioto Val. & N. E. 1sts	75⅞	75	75⅝	+ 3⅛
South. Rail. 5s, when issued	89½	88	88⅝	− ⅛
Average advance, 2.42.				
Miscellaneous.				
Bur., C. R. & N. C. T. 5s	98¾	97	98	+ ⅛
Ches. & Ohio con. 5s	116	108	109	+ 2½
" gen. 4½s	77¾	75⅞	76½	+ ¾
" " R.& A.1st con 4s	94	91	93⅞	+ 3⅜
Can. South 1sts	110⅝	109½	110½	+ ⅝
" 2nds	105½	103¾	105⅛	− 1⅛
Cin., Day. & Iron 1st	100	98¾	99¼	+ ¼
Chic. Gas Lt. & Coke Co.'s 1st	86	85	85	− 3
Ed. Elec., Ill. of N. Y. 5s	108	107	107⅞	− ⅛
G. H. & S. A. Mex. Pac. 5s	92¾	91¼	92¼	+ 1⅛
Hocking Val. 5s	91¾	90	90⅛	− 1⅛
Kanawha & Mich. 4s	76	74	75	+ ¼
Laclede Gas 1st	89	88	88½	
Lake Erie & West. 2nd	103	102	103	− ½
L., N. A. & Chic. con	97½	95	96	+ ⅛
Mobile & Ohio gen. 4s	65	63¾	64	− 2
N. Y. Elevated 1st	111¾	110½	111¼	+ 1¼
Ohio Southern 1sts	93¼	90½	91	− 2½
Oregon Improvement 1st	106¼	106¼	104¼	+ 1¼
" cons 5s	65¼	61½	62	+ 3
Peo. & Eastern 1sts	78½	75	78¼	+ 4¼
San An. & Ar. Pass 4s	57¾	56	56⅛	− ⅜
Tol. Peo. & West 4s	74⅞	71	74⅛	+ 4⅞
Tex. & N. O. con. 5s	92½	91½	92¼	+ ¼
Toledo & Ohio Central 1st	106⅝	105¼	106½	+ 1
U. S. Leather 6s	110½	109	110½	+ 1½
U. S. Cordage 1st	80	77	78	− 4
Va. Midland gen.	96¼	93½	96	− 2¾
Average advance, .37.				

(*Concluded from page 685.*)

is usually forced over to the proper direction without accident to the train. Experienced engineers avoid facing switches as much as possible.

The dangers mentioned are, however, well guarded against by the locking between the switch and the signal levers in the cabin, but it was discovered that a lock was needed at the facing switch itself, to prevent the partial or complete reversal of a switch under a moving train. It

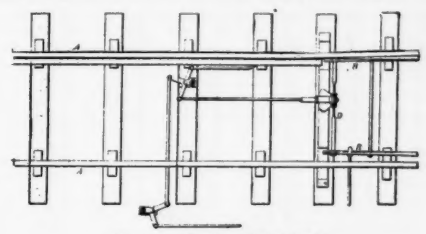
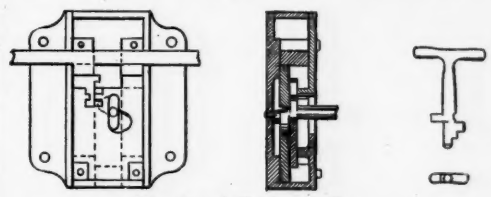


Fig. 159—Facing Point Lock.

need scarcely be pointed out that such a mistake, on the part of the signalman, would cause what is known as a "split," i. e., part of the train would go up the main track and part up the branch. Many serious derailments were caused in this way, before the facing point lock was introduced to obviate the danger. Fig. 159 shows the facing point lock in almost universal use. It consists of two main features, viz.: the detector bar R and the plunger lock C. The lock C slides through a sheath fastened to a tie, and locks the switch points tight home against one stock rail or the other, by being shot through one or the other of the two holes made in the connecting rod D. The detector bar R is longer than the minimum wheel base of the longest cars, and as the plunger lock is moved the detector bar is made to rise above the top of the rail and fall again, its normal position being down, clear of the wheels. As the lock and bar are moved simultaneously by one and the same connection, it will be understood that it is impossible to unlock the switch during the passage of a train over it, because the wheels of the train prevent the upward movement of the detector bar, and as the switch cannot be unlocked it is not possible to reverse it until the train has cleared the switch points. The plunger should be so fitted as to prevent the movement of the lock lever unless the switch point is well home against the stock rail.

Figs. 149 and 150, plate 133, show, in cross section, two forms of detector bar, constructed on the rocking shaft principle. Harrison's facing point lock differs from the Saxby lock chiefly in the use of wedged blocks, which fit against the tongues of the switches and thus hold them fast against the stock rail. Fig. 154 shows a scheme for operating the facing point lock by means of either the branch or the main signal connection; b is the switch connection and C and D are the main and branch signal connections respectively. The ends of two bell cranks are prolonged so as to engage with the slotted end of the lock connection E. It will be readily seen that the lock will be operated by either of the signal connections, the counter weight S unlocking the switch when the signal is returned to danger.

Fig. 153 shows another modification. The locks are also operated by the signal connections, but they are cam shape and will force the switch tongue home, if it has not been so placed by the proper lever. Fig. 175 shows a scheme for dispensing with a compensator in the rod connection. At both ends of the diagonal slot d, in the plate D, there is a prolongation running parallel to the rails. A pin attached to the switch rod engages in this slot. The full stroke of the plate includes a portion—inactive as regards the switch—at each end. These parallel parts of the slot take up the expansion and contraction. At fig. 151 we have a bolt lock, by means of which switches are sometimes locked by wire connections. An ingenious and much used method of protecting trains from misplaced outlying switches, is by means of key interlocking. The lever which operates the switch is fitted with a special lock, which is identical with another lock applied



Figs. 180 and 188—Annett's Key.

to the interlocking machine in the distant cabin. There is only one key and that is usually in the lock at the cabin. When a train is to use the switch the conductor obtains the key from the signalman, but before it can be taken from the lock all conflicting signals must be placed at danger, and the withdrawal of the key locks them in that position. The train then proceeds to the cross-over and the key is used to unlock the switch lever, the reversal of which locks the key in the box, and it can only be withdrawn after the switches have been returned to their normal position. The key is then returned to the signal cabin and inserted in the lock, when the main line signals may again be operated. Figs. 180 to 188 show details of the key and locks.

From this point in the lecture Mr. Johnson goes on to describe various modern devices with which our readers are familiar.

Justice Harlan on Strikes.

In a long decision read by Justice Harlan and prepared by him, the United States Circuit Court of Appeals, at Chicago, on October 1, reversed in part the decision of Judge Jenkins in the case of P. M. Arthur and others in the matter of the Northern Pacific injunction in which Judge Jenkins declared that the men had no right to combine for a strike under certain conditions. Judges Harlan, Jenkins, Bunn, Grosscup and Woods sat in court; the decision was concurred in by Judges Woods and Bunn. The gist of the opinion follows:

The questions before us relate to the powers of a court of equity—having custody by receivers of the railroad and other property of a corporation—to enjoin combinations, conspiracies or acts upon the part of the receivers' employees and their associates in labor organizations, which, if not restrained, would do irreparable mischief to such property, and prevent the receivers from discharging the duties imposed by law upon the corporation. The injunction against employees so quitting as to cripple the property or prevent or hinder the operation

of the railroad, was equivalent to a command by the court that they should remain in the active employment of the receivers and perform the services appropriate to their respective positions until they could withdraw without crippling the property or preventing the operation of the road. The vital question is whether a court of equity will, under any circumstances, by injunction, prevent one individual from quitting the personal service of another. An affirmative answer to this question is not, we think, justified by any authority to which our attention has been called, or of which we are aware. It would be an invasion of one's natural liberty to compel him to work or to remain in the personal service of another. One who is placed under such restraint is in a condition of involuntary servitude—a condition which the supreme law of the United States declares shall not exist. The Justice then went on to discuss whether the fact that the property involved was a railroad, with public duties to perform, gave the court the right to restrain the men from quitting. The receivers, the decision declares, had the right to make a new schedule of wages and offer it to the men with the alternative of accepting it or quitting the service. The men had the right to accept or refuse, and to quit if they were not willing to work for less wages. The rule, we think, is, without exception, that equity will not compel the actual affirmative performance by an employee of merely personal services, any more than it will compel an employer to retain in his personal service one who, for no matter what cause, is not acceptable to him, for service of that character. Undoubtedly the simultaneous cessation of work by any considerable number of railroad employees, without previous notice, will have an injurious effect, and for a time inconvenience the public. But these evils, great as they are, are to be met and remedied by legislation restraining alike employees and employers. In the absence of such legislation, the right of one in the service of a quasi-public corporation to withdraw therefrom whenever he sees fit, must be deemed so far absolute that courts of equity cannot interfere. The result of these views is that the court below should have eliminated from the writ the words "and from so quitting the service of the said receivers with or without notice as to cripple the property or prevent or hinder the operation of said railroad."

It is one thing, however, for a single individual or several individuals, each acting on his own responsibility, to quit work, and quite a different thing in the eye of the law for many persons to combine or conspire together with the intent, not simply of asserting their rights by peaceable methods, but of employing their united efforts to injure others or the public. . . . The general inhibition upon combinations and conspiracies formed with the object and intent of crippling the property and embarassing the operation of the railroads must be construed as referring only to acts of violence, intimidation and wrong. We do not interpret the words last above quoted as embracing the case of employees who, being dissatisfied with the proposed reduction of their wages, merely withdraw on that account, singly or by concerted action, from the service of the receivers, using neither force nor threats, persecution or intimidation toward employees who do not join them, nor any device to molest, hinder, alarm or interfere with others who take or desire to take their places. These employees having taken service first with the company and afterward with the receivers under a general contract of employment, which did not limit the exercise of the right to quit the service, their peaceful co-operation as the result of friendly argument, persuasion or conference among themselves in asserting the right of each and all to refuse further service under a schedule of reduced wages, would not have been illegal or criminal, although they may have so acted in the firm belief and expectation that a simultaneous quitting without notice would temporarily inconvenience the receivers and the public. If, in good faith and peaceably, they exercise their right of quitting the service, intending thereby only to better their condition by securing such wages as they deem just, but not to injure or interfere with the free action of others, they cannot be legally charged with the loss to the trust property resulting from their cessation of work in consequence of the refusal of the receivers to accede to the terms upon which they were willing to remain in the service. Such a loss, under the circumstances stated, would be incidental to the situation, and could not be attributed to employees exercising lawful rights in orderly ways, or to the receivers, who in good faith and in fidelity to their trust, declared a reduction in wages and thereby caused dissatisfaction among employees and their withdrawal from the service. It seems entirely clear that any combination or conspiracy on the part of these employees would be illegal which had for its object the crippling of property in the hands of receivers, either by disabling property, by obstructing the control or management of the property, or by using force, intimidation or wrongful methods against employees remaining in the service to induce them to quit the service. Combinations of this character disturb the peace of society and are mischevious in the extreme. They imperil the interests of the public and endanger the personal liberty and personal security of individuals who, in the exercise of the inalienable privilege of choosing the terms upon which they shall labor, enter or attempt to enter the service of those against whom such combinations are aimed. The Circuit Court, therefore, properly framed its injunction so as to restrain all acts specifically mentioned. We are of the opinion that the court properly refused to strike from the writs of injunction the words, "and from combining or conspiring to quit the service of receivers with the object of crippling the property in their custody."

Justice Harlan declined to pass upon the question whether the court had jurisdiction in this case under the Sherman Anti-Trust act of 1890—an important question at issue in the Debs contempt case.

TECHNICAL.

Manufacturing and Business.

The machinery for the new car wheel works at Raleigh, N. C., has been delivered and is being placed in position. The works will probably begin operations some time in October.

The Atlantic Construction Co., with a capital stock of $4,000,000, has been chartered, with C. M. Coen, John F. Anderson and W. W. Flemming as incorporators.

A 7-ton locomotive crane, made by the Industrial Works of Bay City, Mich., has been placed in the plant of the National Tube Works Co., McKeesport, Pa.

The plant of the Youngstown Steel Roofing Co. has been completed and the machinery started in operation.

The Youngstown Bridge Co., of Youngstown, O., has been awarded the contract for the metal work for dams Nos. 9, 10 and 11 on the Great Kanawha River in West Virginia County. This company has also recently been awarded the contract for two spans of riveted lattice for the Valley Railway of Ohio; and a one-span three-truss bridge on Columbia avenue in Baltimore, Md. The company has under way in addition, quite a large amount of structural and railroad work.

The Altoona Mfg. Co., builders of engines and machinery, have confessed judgment in the sum o $16,000. The plant, which employs about 250 men, is mortgaged for $54,000.

The Pittsburg and the Keystone Bridge Works are on full time and double turn. Both are working on structural material, for early use, and extra men are employed, though there is work enough to keep the men busy until the holidays.

Plans are being prepared for an addition to the foundry of the Chester, Steel Casting Co. at Chester, Pa. It is proposed to erect a building about 170x75 ft. and thoroughly equipped. The plant is now well supplied with orders. It employs about 120 men.

The New York Clearing House has recently contracted for what is perhaps the heaviest vault work ever built. The specifications require that 5-ply welded chrome steel and iron made by the Chrome Steel Works, Brooklyn, be used in its burglar proof construction

The Ohio Falls Car Mfg. Co., has declared a quarterly dividend of 2 per cent. on its preferred stock, payable October 1.

Iron and Steel.

The Greensboro Iron & Steel Co., which was incompletely built several years ago by the North State Improvement Co., which also controlled the Cape Fear & Yadin Valley Railroad, and which recently passed into the hands of the Southern Immigration Land & Title Co., of which Hon. Chauncey F. Black, of Pennsylvania, and A. A. Arthur are leading spirits, was reorganized last week by the election of the following officers: President, Julian S. Carr, of Durham, N. C.; Vice-President, J. W. Scott, of Greensboro; General Manager, J. F. Jordan, of Greensboro; Secretary and Treasurer, D. C. Waddell; Directors, J. S. Carr, J. W. Scott, George Noble, Sr., Neil Ellington, John Wilkes, J. F. Jordan and W. E. Ashley—the latter Manager of the North Carolina Car Co., at Raleigh. The new President, Julian S. Carr, is the President of a tobacco works at Durham, and largely interested in other manufactories in North Carolina. The ore which will be used by the plant will be obtained from North Carolina mines.

In the note last week announcing the reduction in the prices of Mushet's steels, an unfortunate error made nonsense of the paragraph. The present prices of these steels, quoted by B. M. Jones & Co., the United States agents, are 46 cents a pound for R. Mushet's special steel, and 19 cents a pound for Titanic steel.

Ninety-five per cent. of the creditors of the Pennsylvania and Maryland steel companies have assented to the plan of reorganization and subscriptions to the new preferred stock by the present stockholders is considerably in excess of the proposed issue of $1,500,000. An election for temporary directors will be held on Friday next.

The Bethlehem Iron Co. has shipped to Philadelphia 21 car loads of armament, including one 17-in. barbette weighing 40 tons, and a conning tower for the United States ship Massachusetts, and five 18-in. side armor plates weighing 30 tons each for the United States ship Indiana.

The more important industrial establishments in and about Pittsburgh were in operation this week as follows: Oliver Steel Co.'s Twenty-sixth street mill, double turn, full time; Carnegie Steel Co.'s Twenty-ninth and Thirty-third street mills, double turn, full time; Crescent Steel Works, five days a week; Carbon Iron Works, double turn, full time; Jones & McLaughlin's, double turn, full time; Keystone & Pittsburg Bridge Works, double turn, full time; National Tube Works, W. D. Wood plant, and Monongahela Steel Works, all of McKeesport, double turn, full time; Sterling Steel Works, single turn, full time; Edgar Thomson plant, Bradford, five days a week; most of the Duquesne plants, double turn, full time; McConway-Farley plant, Lawrenceville district, double turn, full time; Hainsworth steel plant, shut down for a week by the breakng of a piston rod.

Orlando Harvey, Master to inquire into the advisability of selling the property of the Wellman Steel Works, at Chester, Pa., has filed his report recommending that the plant be sold within 60 days. Judge Clayton confirmed the order, and said that, if nothing be done within 60 days towards settling with the creditors or continuing the plant, a decree for the sale of the works would be issued on Nov. 17. The creditors have been opposed to a sale of the plant at so early a date.

The title of the Allegheny Steel Co. has been changed to A. M. Byers & Co., A. M. and E. M. Byers transferring their holdings to the new company, in which they hold $499,500 worth of stock.

The Ohio Steel Co., Youngstown, O., has increased its capital stock to $1,250,000, and the increase will be largely taken by the present stockholders. When the company started the project of building an extensive steel plant it was believed that $750,000 would be sufficient. Later it was found necessary to increase the stock to $1,000,000 by reason of the extensive improvements. Since then another increase was found necessary. Although a large force of men are engaged it is not expected the concern will be ready to turn out steel until the opening of the new year.

Car Heating.

We mentioned recently the action of the Baltimore & Ohio, Central of New Jersey and Reading in adopting the Gold car heating coupler as standard. In that note we said that the action of the Pullman officers in the conference applied only to the cars running in the "Royal Blue" line. We are informed that it applies to all Pullman cars running over the Baltimore & Ohio and the Baltimore & Ohio Southwestern, that is, to about 125 Pullman cars.

At the recent annual meeting of the Gold Company the President reported orders booked for complete equipments for about 1,000 cars.

A Mannesmann Tube Works in America.

The *Iron Age* makes the important announcement that Colonel Pope, of the Pope Manufacturing Co., has made arrangements with the Mannesmanns, under which a plant will be erected at Hartford, Conn., for the manufacture of steel tubing under the Mannesmann processes. The Pope Mannesmann Co. is to be capitalized at $750,000, and will have the exclusive rights to manufacture under the process for bicycle tubes and for locomotive boiler tubes up to 2 in. in diameter. It is said that ground will be broken at once for the works, but that the contracts for machinery have not been closed. The consumption of Mannesmann tubes for the manufacture of bicycles has grown to be immense. Contracts have recently been closed for one lot of 200,000 ft., and for another lot of 300,000 ft. and the yearly sales for bicycle frames alone amount now to 1,500,000 ft. in the United States. All of this is imported. The new company will manufacture only the two lines of tubing here mentioned, the Mannesmanns retaining the right to make in the United States all other sizes.

Locomotives for Sale.

Ten locomotives ordered from the Rhode Island Locomotive Works by the Lake Street Elevated Road, of Chicago, are offered for sale. The locomotives are of the Rhode Island compound type and were described and illustrated in *Railroad Gazette* of August 4 and 11, 1893. Particulars may be obtained from Mr. James T. Gardner, the Rookery Building, Chicago.

The Lucania's Last Record.

As predicted in these columns some weeks ago the Lucania has lowered the westward record of ocean travel in her recent trip ending September 28. Twice now she has arrived at Quarantine early enough to be inspected and to land her passengers on the evening of arrival. Her time was 5 days, 7 hours and 48 minutes, being 50 minutes better than her last westward record.

The short passage was not due to higher speed than what she had maintained on previous occasions, but to the fact that she took a short northerly course of only 2,782 knots. Her average hourly speed was 21.76 knots. In June last she made an hourly average on an eastward passage of 21.89 knots, but it was on a long southerly course of 2,911 knots. Had she maintained the speed of 21.89 knots on this record she would have reduced the record to 5 days and 7 hours.

The Lucania left Daunt's Rock at 12:40 o'clock on Sunday afternoon and arrived at the Sandy Hook lightship at 3:53 Friday afternoon. Her daily runs were 531, 542, 541, 529, 552 and 87 knots, or an average of 539 knots a day, which is the best daily average yet made by any steamship on a westward passage across the Atlantic. The Lucania has herself before made a daily record of 560 knots on a westward passage, but it can hardly be expected to be maintained for 5 days in succession. She carried 697 first and second cabin passengers and 653 steerage passengers.

The Pope Gas Light.

The Consolidated Car Heating Co. is about to manufacture lamps and fittings for compressed oil gas on a large scale. The compressed gas plant recently erected shows excellent results, 17,600 cubic feet of gas of 50 candle-power having been obtained from 160 gallons of oil—that is, 110 feet per gallon, whereas the usual make is somewhat under 90 feet. The Consolidated Company is preparing an exhibit of Pope lighting apparatus at Albany, carrying out a similar plan to that it established in 1892 with reference to steam heating apparatus, when special trains were run hourly to Troy and return during two days, when many prominent railroad officials were present to observe the operation of the Sewall coupler and commingler storage systems.

Gas for Headlights.

In describing the locomotives building for the Central Railroad of Brazil by the Brooks Locomotive Works we have mentioned the fact of the use of Pintsch gas for headlights. Twenty-five of these engines are double-ender Forney-type, locomotives for suburban service, and these are supplied with headlights for burning Pintsch gas, furnished by the Safety Car Heating & Lighting Co. Each locomotive is equipped with two 20-in. headlights, each with a powerful Argand burner, one headlight being placed above the smoke-box and one on top of the tender tank. In addition there are four gas signal lights, two on the bumper and two on the rear end of the tender. The cab has a one-flame Pintsch lamp, with a metal globe, a slot in the metal cover permitting the light to shine on the faces of the gages. The gas tank is hung below the cab floor, between the side frames

of the tender. Each locomotive is equipped with proper cocks, provided with by-passes whereby the gas supply to the headlights and signal lights at either end can be cut down when necessary, so that the lights are left just burning.

A test was recently made of one of these headlights on an engine in the Delaware, Lackawanna & Western yards at Hoboken, N. J., to the satisfaction of the railroad officials and the Pintsch people. The flame was clear and steady, and with a consumption of less than four cubic feet of gas per hour, gave a light which the locomotive engineers thought was at least three times as powerful as that of similar oil headlights in use on the road under similar conditions. Moreover the light did not obscure the signal and other lights about the yards, which is one of the objections sometimes brought against electric headlights. In South America Pintsch gas headlights have been in use on locomotives for several years. The Pintsch Company in Germany has equipped 31 Brazilian locomotives with them; and the Safety Car Heating & Lighting Co. had equipped 20 before this order.

Interlocking.

The National Switch & Signal Co., has closed a contract through Mr. H. J. Payne, Chief Engineer, of the Duluth, South Shore & Atlantic, for interlocking the crossing of the Chicago, St. Paul, Minneapolis & Omaha and the Lake Superior Terminal & Transfer Railway at west Superior, Wis.

The double anti-friction pipe carrier lately introduced by this company is meeting with considerable success.

THE SCRAP HEAP.

Notes.

Richard Nagel was sentenced to 20 years' imprisonment at Waterloo, Ill., last week, for derailing a train on the Mobile & Ohio near Forest Lawn, Ill., on June 4, when the fireman was killed.

The Illinois Central bridge over the Iowa River at Iowa Falls was burned down on Sept. 28. It was 600 ft. long and 26 years old.

At Fergus Falls, Minn., on Sept. 25th, 62 Great Northern strikers, many of whom had been in jail several weeks, were released, Judge Nelson sustaining a demurrer to the indictments. Another despatch reports that indictments for obstructing the mail trains on the Great Northern have just been found against five strikers at St. Cloud, Minn.

Washington correspondents report that Secretary Moseley, of the Interstate Commerce Commission, is organizing a "National Humane Society," with one of its principal objects to see that the heroic deeds of railroad men shall be duly recognized.

At Braddock, Pa., 3 locomotive engineers have been fined $10 each for illegal blowing of whistles.

The employees of the Philadelphia, Reading & New England have been informed that the 15 per cent. taken off their wages last Feburary will be restored on Nov. 1.

Judge Ross, in the United States District Court at Los Angeles, Cal., has made a favorable decision on the application of the Postal Telegraph Co., for leave to build a telegraph line along the right-of-way of the Atlantic & Pacific Railroad; this notwithstanding the fact that the Western Union had an exclusive contract with the road.

It is announced from Hiawatha, Kan., that the artisans from Pullman who have been seeking a location for a shop have settled in that town and will begin the manufacture of bicycles.

"The Hallstead Temperance League" is the name of an organization of employees of the Delaware, Lackawanna & Western recently reported from Buffalo, Binghamton and other places on the line of that road.

A passenger train of the Southern Pacific was stopped by robbers near Maricopa, Ariz., on Sunday night last, and the express car was successfully rifled, but it is reported that the amount of valuables taken was small. A later dispatch reported that one of the robbers was shot and captured. On Sept. 26 there was an unsucessful attempt to rob a passenger train of the Atchison, Topeka & Santa Fé at Temple, Tex.

A train of the Cleveland, Cincinnati, Chicago & St. Louis, consisting of an engine and 3 cars, recently ran from Chicago to Indianapolis, 195 miles, in 4 hours 8 minutes. The name of the new fast train over this road from St. Louis to Cleveland is the Knickerbocker Special.

The shops of the Boston & Albany have begun running full time, which is 8 hours a day, six days in the week. They have been running only half-time for many months. The shops of the Northern Pacific at Edison, Wash., are now running full time, 300 men being employed.

Frank B. Furnald, a clerk in the office of the Auditor of the New York, New Haven & Hartford, was discharged last Monday on the charge that he had for some time been supplying monthly statements of the passenger business of his road to the Boston & Albany. A dispatch from New Haven says that Furnald confessed that he had received $10 each month from the Boston & Albany for two years. President Bliss, of the last named road, says there is no truth in such a statement.

The United States Court of Appeals at Chicago has continued the case of Debs and the other Directors of the American Railway Union, who took an appeal from the Woods-Grosscup injunction restraining them from interferring with railroad property during the recent strike, to the next term of court, at the request of the defendants

Track Elevation in Indianapolis.

Plans for track elevation in Indianapolis have been presented by the Commercial Club to the City Council for its consideration. These plans provide for the elevation of tracks from West to Noble streets, with the necessary approaches at each end, and for the elevation of the Union Station, and all freight depots and yards between Mississippi and Liberty streets. It is proposed to do the work by building stone retaining walls each side of the area to be elevated, and filling with earth the space between these walls. The cost to the railroads is estimated at $1,076,400, and the total cost for the whole elevated tracks and yards is put at $2,076,400. It is said the Union Station and tracks can be elevated for $100,000. The cost would be divided among the railroads as follows: Vandalia, $67,800; Pennsylvania Co., $75,000; Cincinnati, Hamilton & Dayton, $147,600; Lake Erie & Western, $159,600; Big Four, $558,900; Indianapolis Decatur, & West, ern $67500. The estimated cost for elevating all tracks to the city limits is $4,000,000.

Pumps for the Pittsburg Water Works.

Bids were opened last week for two new high-grade pumping engines for Pittsburgh's Water Works, to have a capacity for about 12,000,000 gallons by each firm, the first for two and last for four engines, as follows: Edward P. Allis Co., Milwaukee, Wis., $173,000 and $330,000 Henry R. Worthington, $173,500 and $338,000; Wilson-Snyder Manufacturing Co., Pittsburgh, $175,490 and $350,980; Holly Manufacturing Co., Troy, N. Y., $191,400, and $374,000. The contract was awarded to the Allis Company.

Second Hand Rails.

The Grand Trunk Co. invites offers for four or five miles of second-hand iron rails, 40 lbs. to the yard, together with fish plates and bolts suitable for the same. The company has for sale about 2,500 tons of old iron rails, delivery of which will be made at any point on the company's line that may be agreed upon.

The Scrantons Keep Their Bonds.

Judge Green has filed an opinion in the United States Circuit Court of Appeals at Philadelphia, in favor of William W. Scranton and Walter Scranton in an important litigation growing out of the re-organization of the Lackawanna Iron & Steel Company, of Scranton, Pa.

A number of stockholders of the former Scranton Steel Co., charged that $350,000 in bonds of the new company, paid to W. W. Scranton, the president of the old company, and to Walter Scranton, its Vice-President, under an agreement that the two Scrantons, who are brothers, should not re-engage in the business in competition with the new company, should not have been paid them, but to the old company itself. The Scrantons contended that the $350,000 in bonds were a bonus to them.

The matter was originally heard by Judge Acheson in the Circuit Court at Pittsburg, and resulted in the bonds being awarded to the Messrs. Scranton. The dissatisfied stockholders of the old company took an appeal from the finding and the case was argued last March before Judges Dallas, Butler and Green.

Judge Green in his opinion says: "In our opinion, the transaction, as consummated, so far as the consolidation of these two companies is concerned, is not tainted by a scintilla of fraud on the part of the defendants It was conducted openly and fairly; was brought in its earlier and later stages to the knowledge of a very large number, if not all, the stockholders interested, who were presented by the defendants, and the terms of consolidation, as finally agreed upon, when submitted to the stockholders of the Scranton Company, including the complainants, was approved not only with entire unanimity, but as a great 'triumph.'"

Lake Notes.

Iron ore shipments from the Lake Superior region to date have been: Gogebic range, Michigan and Wisconsin, 1,325,000 gross tons: Mesaba range, Minnesota, 1,300,000; Marquette and Menominee ranges combined, Michigan, 2,000,000 tons; Vermilion range, Minnesota, 850,000 tons. Before the close of the season over a million tons additional will be shipped.

Lake shipments of lumber to date from Duluth have been more than for any preceding entire year—110,000,000 feet.

It is expected that three iron ore railroads running out of Duluth—the Duluth & Iron Range, Duluth, Miesabe & Northern, and Duluth, Mississippi River & Northern—will add considerably to their mileage this winter. The former will build 10 miles from Evelyth to McKinley, and probably 20 miles of a cut-off from Highland to the lake, as well as possibly a new Mesaba line of 50 miles. The second company will build two 6-mile branches and possibly more. The third will build about 30 miles of main line and branches, partly for the ore and partly for the log trade.

The Eastern Minnesota road is beginning work on a 2,800 car yard, a 25-stall round house, etc., at Sandstone, one of the towns south of Duluth that was completely wiped out by the late forest fires.

Securities Listed on the New York Exchange.

The Governing Committee of the Stock Exchange has listed the following securities:

Chesapeake & Ohio, additional issue of general mortgage 4½ per cent. gold bonds, $2,112,000, making the total amount listed $21,786,000.

Cleveland, Cincinnati, Chicago & St. Louis, additional issue of $2,500,000 first collateral trust mortgage 4 per cent. gold bonds on its St. Louis division, making total amount listed $9,750,000.

Seaboard & Roanoke, first mortgage 5 per cent. currency bonds, $2,500,000.

LOCOMOTIVE BUILDING.

The eight-wheeled passenger locomotives recently ordered by the Illinois Central Railroad Co. of the Brooks Locomotive Works, are to have 18 × 24 in. cylinders, guides and crossheads of the four-bar type, American balanced slide valves, 69 in. drivers with Krupp tires, 33 in. Krupp No. 1 engine truck wheels, and 36 in. double plate tender wheels. The tender is to have a wood frame, a water capacity of 3,850 gallons and a coal capacity of 7 tons. The boilers are to be of the wagon top type, with crown bar fire-box, shell of 60 in. diameter, 241 2 in. flues, and to carry a steam pressure of 180 lbs. The firebox will be 33 in. wide and 78 in. long. They are to be equipped with Westinghouse driver, tender and train brakes and air signal with a 9½ in. pump. Nathan triple sight feed lubricators will be used and "Ohio" injectors on one side and Monitor on the other.

The mogul locomotives ordered by the same company from the Rogers Locomotive Co. will have 19 × 26 in. cyinders. Laird guides and crossheads, American balanced valves, 56½ in. drivers with tires of an American manufacture. The truck wheels are to be of the spoke pattern with steel tires. The tender wheels will be 33 in. double plate, of cast iron. The tender frame is to be of wood and the tender of the same capacity as the passenger engines mentioned above. The boilers are to be of the Belpaire type, 62 in. in diameter, with 236 2 in. tubes, a 33 by 114 in. firebox, and carry a pressure of 180 lbs. The Westinghouse train brake is to be used and the American outside equalized driver brake operated by air and applied to the forward side of drivers. Air will be supplied by a 9½ in. Wetstinghouse pump. These engines will have the Nathan triple sight feed lubricators and lifting injectors.

Carbon steel will be used in the boilers of both the passenger and mogul locomotives. All bearings will be of Cicero bronze, the crank pins of Coffin treated steel. French springs will be used throughout and all locomotives equipped with the Nutting smoke preventer, with a brick arch in the firebox.

The moguls will have a weight of 126,000 lbs., with 106,400 on drivers, and the eight-wheelers a total weight of 114,000 lbs., with 72,000 on drivers.

The Grand Trunk Railroad is building at its Montreal shops two locomotives, one of which is to be a single expansion and the other a compound. The latter is to have the compounding features of the Rhode Island Locomotive Works; aside from the special compounding details the two locomotives are to be duplicates of each other, and, as near as can be calculated, the are to have the same cylinder power and carry the samy boiler pressure, 180 lbs. The locomotives are being builc for the purpose of making a test of the efficiency of thet two types under various conditions of service. Mr. Wallis, the Superintendent of Motive Power of the road, interprets the reports of tests of the two types made on other roads as favorable to the compound type in some kinds of service; the tests will be made under the supervision of Mr. Wallis. It was intended to have the two locomotives completed in time to make the tests this fall, but the closing of the shops during six weeks last summer delayed the work to such an extent that it is now probable that the tests will not be made till next spring.

At the Juniata shops of the Pennsylvania work has been re-commenced on an order for 18 Class R engines. This order was given some months ago, but the work was stopped when the orders for reducing expenses were issued.

The Schenectady Locomotive Works have recently received an order from the Boston & Albany for six 6-wheel switching locomotives, four passenger and four consolidation locomotives.

CAR BUILDING.

The Merchants' Dispatch Transportation Co. is asking bids on 300 freight cars.

The Mexican Central is asking bids on 250 freight cars.

BRIDGE BUILDING.

Bluefield, W. Va.—A movement has been set on foot for building a highway bridge over New River, near Luric, W. Va. The counties of Monroe, W. Va., and Giles, Va., and the Norfolk & Western Railroad are the interested parties. A conference of representatives of these bodies will meet at Luric to view the ground and estimate the cost. The bridge is to give the people of the counties interested an outlet to the Norfolk & Western Railroad, which is now shut off from them by the river, although the railroad is within a few miles.

Homestead, Pa.—The contract for furnishing and erecting the iron work of the new Pittsburg and Homestead bridge, at this place, has been awarded to the Phœnix Iron Co., of Phœnixville, Pa.

Jefferson City, Mo.—The Directors of the Jefferson City Bridge & Transit Co. have accepted the bid of the Missouri River Bridge Co., of Leavenworth, Kan., to construct a bridge over the Missouri River between Jefferson City and Cedar City for $205,000. Of this amount $50,000 has been subscribed as a bonus by private citizens, and the remainder will be raised by the Bridge & Transit Co.

Johnstown, Pa.—The County Commissioners have awarded to the Massillon Bridge Co. the contract for the erection of a one-span high truss iron bridge over the Conemaugh River at Wilmore. The price is not to exceed $19 per linear foot and the span is not to exceed 100 ft. in length and have a width of 14 ft.

Lansing, Mich.—A recent decision of the Michigan Supreme Court will enable this company to issue the bridge bonds authorized for the construction of bridges to connect the east and west sides of the city. The erection of bridges connecting the two divisions of the city was agreed upon when the towns were consolidated a few years ago. The city, however, was enjoined from issuing the bonds and for over a year the litigation has been before the Supreme Court on appeal.

Poquonock, Conn.—An iron bridge is to be erected over Poquonock Creek.

Safe Harbor, Pa.—The Pennsylvania has decided to construct a stone bridge across the Conestoga Creek, near this place, on the Columbia & Port Deposit Railroad. The bridge will be about 300 ft. long and will cost about $30,000.

Somerset, Pa.—Viewers have reported in favor of a bridge over Stony Creek on the road from Terre Hill to Scalp Level. They have reported adversely on proposed bridges over Brush and Quemahoming Creek.

Toronto, Ont.—The proposed high level bridge over the Don River at Queen street will be erected shortly.

Mr. John Galt, C. E., has prepared plans for a steel bridge at Mount Pleasant.

United Counties.—Ties have been purchased for the extension of the railroad from St. Hyacinthe, Que., to Highgate, Vt., to connect with the Boston & Maine Railroad. Work on the new extension is expected to begin early in the spring. The 30 miles of road now completed are operated by J. W. Dawsey as General Manager.

Williamstown, Pa.—Viewers have recommended the building of a county bridge over Wiconisco Creek at this place.

Williamsport, Pa.—All the bids for erecting the Maynard street Pratt truss bridge have been rejected by the county commissioners on the ground that they were all too high. Proposals will again be invited.

Yarmouth, N. S.—Tenders will shortly be asked by Mr. A. H. Chadbourne, Superintendent of the Coast Railway for masonry and steel work of bridges at Salmon and Tusket Rivers.

York, Pa.—The County Commissioners have decided to build a bridge over Muddy Creek at Bruce.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Central of New Jersey, quarterly, 1¼ per cent., payable Nov. 1.

Concord & Montreal, $1.50 per share on classes 1, 2, 3 and 4, payable Nov. 1.

Delaware, Lackawanna & Western, quarterly, 1¾ per cent., payable Oct. 20.

New York Central & Hudson River, 1¼ per cent., payable Oct. 15.

Norfolk & Southern, quarterly, 1 per cent., payable Oct. 10.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Atchison, Topeka & Santa Fé, annual, Topeka, Kan., Oct. 25.

Boston & Providence, annual, Boston, Mass., Oct. 10.

Chesapeake & Ohio, annual, Richmond, Va., Oct. 23.

Cleveland, Cincinnati, Chicago & St. Louis, annual, Cincinnati, O., Oct. 31.

Illinois Central, annual, Chicago, Ill., Oct. 17.

Northern Pacific, annual, Mills Bldg., New York City, Oct. 18.

Piedmont & Cumberland, annual, Baltimore, Md., Oct. 9.

St. Louis & San Francisco, annual, St. Louis, Mo. Oct. 23.

St. Paul & Duluth, annual, St. Paul, Oct. 11.

Seattle, Lake Shore & Eastern, annual, Seattle, Wash., Oct. 18.

West Virginia Central & Pittsburgh, annual, Baltimore, Md., Oct. 9.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Railway Association* will hold its fall meeting at the Hotel Brunswick, New York, on Oct. 17.

The *American International Association of Railway Superintendents of Bridges and Buildings* will hold its annual meeting in Kansas City, Mo., beginning Oct. 16.

The American Society of Railroad Superintendents will meet at the Hotel Brunswick, New York City, on Oct. 15.

The American Street Railway Association will hold its annual convention at Atlanta, Ga., commencing Oct. 17 and lasting three days.

The *Western Railway Club* will hold its first fall meeting at the Y. M. C. A. Building, La Salle Street, Chicago, Oct. 18, at 2 p. m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the fourth Wednesday of January, March, April, September and October, at 10 a. m. At the October meeting Mr. Morford's paper on "Terminal Yards" will be the opening subject for discussion.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station, on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Wednesday in each month, at 8 p. m. The headquarters of the society are at 51 Lakeside Building, Chicago.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m.

The *Engineers' and Architects' Club of Louisville* meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds informal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 8 p. m.

The *Boston Society of Civil Engineers* meets at Wesleyan Hall, 36 Bromfield street, Boston, on the third Wednesday in each month, at 7.30 p. m.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St Louis, on the first and third Wednesdays in each month.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at The Cumberland Publishing House, Nashville, Tenn.

The *Engineers' Society of Western Pennsylvania* meets in the Carnegie Library Building, Allegheny, Pa., on the third Tuesday in each month, at 7.30 p. m.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Denver Society of Civil Engineers* meets at 36 Jacobson Block, Denver, Col., on the second and fourth Tuesdays of each month except during July, August and December, when they are held on the second Tuesday only.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7.30 p. m.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati, O., on the third Thursday in each month, at 7.36 p. m. Address P. O. Box 333.

The *Foundrymen's Association* meets at the Manufacturers' Club, Philadelphia, Pa., on the first Wednesday in each month.

American Society of Railroad Superintendents.

Secretary C. A. Hammond has issued the notice for the twenty-fourth meeting of the society, which will be held at the Hotel Brunswick, New York City, on Monday, October 15, at 10.30 a. m.

The Society will be favored with an address by Mr. Willard A. Smith, of Chicago, on Railway Education. The principal business will be: Election of vice-presidents and two members of executive committee; reports of Committee on Roadway, D. B. McCoy, Chairman; on machinery, J. F. Divine, Chairman; on Transportation, F. K. Huger, Chairman, and on Signaling, W. G. Wattson, Chairman. These will be followed by discussion of the following topics:

(*a*) Is there sufficient reason for discontinuing the use of white or clear light as a safety signal in American railway practice? If so, what color can be substituted to mean "safety," and what to mean "caution?"

(*b*) What principles are to be recommended for fixed signals, especially for block signals and interlocking, that will promote uniformity in installation, simplicity in operation and clearness in signification?

(*c*) Is the use of derailing switches in terminal yards to be recommended?

(*d*) What principles and methods have been found, in your experience, most effective, in order to obtain trained, reliable and loyal employees in the operating department?

(*e*) Experience in the application of the Standard Code of Train Rules in case of doubt or difficulty.

(*f*) Special instances of economy in the handling of freight service.

It is hoped that members will prepare themselves to discuss the topics, or to read short papers upon them. All railroad superintendents are invited to be present. The office of Secretary Hammond is now at 32 Liberty street, New York City.

Western Society of Engineers.

The October meeting of the Western Society of Engineers was held on Oct. 3, at the Grand Pacific Hotel, Chicago. The following papers were presented: "Notes on a Broken Pinion Shaft," by Mr. Onward Bates, Engineer and Superintendent of Bridges and Buildings, Chicago, Milwaukee & St. Paul Railway, and "General Hydraulics of Chicago Main Drainage Channel, Effect on the Lakes, Des Plaines, Illinois and Mississippi Rivers, etc.," by Mr. T. T. Johnston, First Assistant Chief Engineer, Chicago Sanitary District.

American Institute of Electrical Engineers.

The first Fall meeting of this Institute was held on Sept. 19. A paper by Frederick Bedell and Carl Kinsley, of Ithaca, N. Y., entitled "The Study of the Residual Charges of Condensers and their Dependence Upon Temperature," was read by title and was followed by a discussion. Mr. E. A. Sperry, of Cleveland, O., read a paper on "The Electric Brake in Practice." In accordance with the plans established by the institute last year, a meeting for the western members was held on the same evening at the Armour Institute, Chicago, for the discussion of the same papers.

Western Railray Club.

At the September meeting of the Western Railway Club, held in Chicago on Sept. 18, Secretary Crosman reported an increase of 109 in the membership since the last meeting in May. The report of the committee on Shop Tests of Locomotives was received and the committee discharged. The Executive Committee was instructed to confer with the Western Society of Engineers and the Institute of Electrical Engineers, with a view to securing a permanent place of meeting and also in regard to the use of the library and reading rooms of the Western Society of Engineers. The topical discussion on coach steps was postponed, and upon motion of Mr. J. N. Barr the topic of Interchange at Chicago was taken up. This is reported on another page. This discussion was followed by Mr. E. M. Herr's paper on Notes and Impressions of Foreign Railway Practice.

American Society of Civil Engineers.

The Nominating Committee has reported the following ticket for officers for the coming year: President, George S. Morison; Vice-Presidents, Desmond Fitzgerald, Benjamin N. Harrod; Secretary, Othniel F. Nichols; Treasurer, John Thomson; Directors, George H. Brown, George S. Benzenberg. Robert Cartwright, Fayette S. Curtis, Augustus Mordecai and Charles Sooysmith.

A meeting of the Society was held on the evening of Wednesday, September 5, Past President Cohen in the chair. The names of two Associates and three Juniors, elected such by the Board of Direction, were announced. Letters of thanks were presented from the Society of Civil Engineers of France, accompanied by souvenirs and bronze medals commemorating the visit to this country last year of a delegation from that Society. A paper was read by the Secretary entitled: "Some Notes on Hot-Bath Tests for Cements," by Frederick H. Lewis and J. Edward Whitfield. Written discussions were also read from Messrs. William H. Booth, M. J. Butler and L. C. Sabin, and the paper was further discussed by Messrs. R. W. Lesely and T. D. Whitaker.

At the meeting held on Wednesday evening, September 19, a paper was read by the Secretary on the "Improvement of Gray's Harbor, Washington," by B. W. De Courcy, M. Am. Soc. C. E.

At the meeting held on Wednesday evening, October 3, a paper was read on "The Myrtle Avenue Improvement on the Brooklyn Elevated Railroad," by O. F. Nichols, M. Am. Soc. C. E. An abstract is published in this issue.

Boston Society of Civil Engineers.

At the regular meeting of the Boston Society of Civil Engineers held at its rooms, 36 Bromfield street, Boston, Mr. Albert F. Noyes presided and forty members and visitors were present. Ira N. Hollis, professor of engineering at Harvard University, was elected a member of the Society. The Secretary read a communication form the Secretary of the Society of Civil Engineers of France, transmitting an official letter of thanks for the reception received by its delegates at the time of their trip to America. The Secretary stated that he had received from the same source a number of medals and drawings, souvenirs of the trip, one of each being designated for the Society and the balance to be distributed among the members of the Society who took special part in the reception of the French Engineers. The Secretary was directed to acknowledge the receipt of the communication and the gifts and to convey to the Society of French Engineers the thanks of the Society.

Prof. Gaetano Lanza gave an account of some of the results of recent experiments in testing materials made in the Engineering Laboratories of the Massachusetts Institute of Technology. He spoke particularly of tests made on the riveted joints in the webs of plate girders and exhibited several specimens of the joints tested. He also gave the results of some recent tests on the strength of timber. A general discussion followed in which Messrs. Dean, Snow and Parker took part.

American Railway Association.

The fall meeting of the American Railway Association will be held at the Hotel Brunswick, New York City, on Wednesday, Oct. 17, 1894, at 11 a. m. Reports will be presented by the following committees: Executive Committee, Committee on Train Rules, Committee on Car Service, Joint Committee on Interlocking and Block Signal, and the Committee on General Regulations for Employees. Three members of the Committee on Car Service and three members of the Committee on Safety Appliances are to be elected.

Engineers' Club of St. Louis.

The club met Sept. 19, at 1,600 Lucas place, President Crosby in the chair, and nine members present. Mr. E. A. Hermann addressed the club on "Reconstruction and Improvement Work on Railroads." The paper was not only very general in character, but positively misleading, judging from the abstract received. The discussion was participated in by Messrs. Crosby, Eayrs, Flad, McCulloch, Curtis and Bryan. The unsatisfactory character of the present type of rail fastenings was mentioned. Some discussion was had on the welding of rails, but there appears to be as yet insufficient data to base an opinion upon as to the merits of the method.

PERSONAL.

—Mr. William L. Bull, of New York City, has been elected President of the Minneapolis & St. Louis.

—Mr. Willard A. Smith has been appointed honorary curator of transportation of the department of industrial arts of the Field Columbian Museum, of Chicago.

—Mr. F. W. Porter, Auditor of the Chicago, Rock Island & Pacific Railroad, was stricken with apoplexy on September 27 at a hotel in Cincinnati as he was about leaving for the Chicago train and died later in the day.

—Mr. G. E. Gifford, Engineer of the King Bridge Co., of Cleveland, O., will hereafter make his headquarters at 18 Broadway, New York, and will take charge of the Eastern business, retaining the title of Engineer of the company.

—Mr. W. R. Israel, traveling passenger agent of the Illinois Central, with headquarters at Chicago, has been appointed General Northern Passenger Agent to succeed Mr. P. B. Bowes, who has been transferred to New Orleans as Assistant General Passenger Agent.

—Mr. O. P. McCarty, who recently resigned as General Passenger Agent of the Baltimore & Ohio Southwestern, has been appointed General Traveling Passenger Agent of the Southern Pacific, with headquarters in New Orleans.

—Mr. Sanford Keeler has been appointed General Manager of the Saginaw, Tuscola & Huron Railroad in Michigan. Mr. Keeler has been General Superintendent of the Iron Range & Huron Bay Railroad, taking that position in 1891, while the railroad was under construction. He was formerly with the Flint & Pere Marquette Railroad as Division Superintendent for over 15 years.

—Mr. George Pandely, President of the Whitney Iron Works of New Orleans, La., died at his home in New Orleans, Sept. 28, after a brief illness. He was one of the organizers and promoters of the Morgan Railroad in Louisiana when it was constructed in 1840, and at one time was General Manager of the road. He was one of the largest holders of Southern Pacific stock in the South.

—Mr. R. E. Briggs, formerly Chief Engineer of the Denver & Rio Grande, and recently in charge of reconnoissance for the Mexican, Cuernavaca & Pacific Railroad now building in Mexico, has assumed temporary charge of the engineering department of the company. Mr. John E. Earley, Chief Engineer of the company, has resigned, as recently reported. The office of Chief Engineer has been abolished.

—Mr. Isaac V. Baker, who died at his home at Comstocks, N. Y., on September 27, in his eighty-second year, was formerly widely known as a successful railroad manager in New York. He was for some years General Superintendent of the Troy and Boston Railroad, and afterward General Manager of the Rensselaer & Saratoga Railroad and its leased branches. He built for the Delaware and Hudson the New York and Canada Railroad, and became its President. One of his sons, Mr. I. V. Baker, Jr., is an Ex-State Railroad Commissioner of New York.

—Mr. Frank H. Forbes, Freight Agent of the Fall River line, died at his home in New York City on September 27. Mr. Forbes was born in New Bedford, Mass., and, like every young man of that town, he took to the sea, and made several trips to China and other far away places. After the close of the Civil War, in which he served, he superintended the building of the propellers "City of New Bedford" and "City of Fitchburg" for the New York & New Bedford Steamboat Co., of which early in its organization he was made agent and treasurer. This place he held until the New Bedford line was purchased by the Old Colony Steamboat Company in 1879, when he was appointed freight agent of the latter company in New York.

—Mr. William H. Russell, Chief Engineer of the Boston & Albany, has been made Consulting Engineer, and his former office will be filled by Mr. Walter Shepard, of Boston, who has been Assistant Chief Engineer for several years. Mr. Russell is now about 76 years old, and he has been Chief Engineer of the Boston & Albany and its predecessor since 1858. He worked with the surveyors in the construction of the road as far back as 1838, but was a farmer from 1842 to 1845, and then worked as an engineer in the construction of the New York & New Haven, the New London Northern and other roads before returning to the Western. The local papers say that besides being promoted he receives an increase of salary.

—Mr. Orlando Stewart, formerly Superintendent of Motive Power of the Fitchburg Road, has been appointed Superintendent of Motive Power and Machinery of the Bangor & Aroostook Road, with headquarters at Oldtown, Maine. Mr. Stewart has been for many years one of the leading mechanical railroad officials of New England, and a prominent member of the New England Railroad clubs, before which he has read many important and interesting papers. He is treasurer of the American Railway Master Mechanics' Association. The Bangor & Aroostook now operates nearly 200 miles of road, and about 60 miles will probably be completed this fall. Mr. Stewart expects to erect new shops for the company next spring.

—The body of Mr. James B. Caven, General Freight Agent of the Valley Railroad, of Ohio, was found in a street of Cleveland, O., early on the morning of Sept. 25. An examination of the body showed that he had met a violent death. The police have not yet been able to discover any clue as to the exact manner of his death and

they have not yet made any arrests. Mr. Caven had been connected with the Baltimore & Ohio for over 30 years. In February, 1890, he was transferred from Pittsburgh to Cleveland to assume charge of the freight and passenger business of the Valley Railroad, which had then come into control of the Baltimore & Ohio Railroad. His earliest railroad work was as a trainman on the Pittsburgh & Connellsville Railroad. He afterwards went to Pittsburgh and was connected with the freight department of the Baltimore & Ohio at that place until his removal to Cleveland.

—Gen. W. W. Duffield, of Detroit, has been nominated by President Cleveland to be Superintendent of the Coast and Geodetic Survey, to succeed Professor T. C. Mendenhall, resigned. General Duffield has had a long civil and military career. He served in the Mexican war, and after its close began his career as an engineer. He was resident engineer of the Hudson River Railroad in 1851, and then Chief Engineer of the Oakland & Ottawa Railroad of Michigan, and located the line from Pontiac to Grand Haven. He was afterward Chief Engineer of the Central Military Tract Railroad, of Illinois, now a portion of the Chicago, Burlington & Quincy Railroad, and built that line, and then served as Division Engineer of the Grand Trunk Railroad until the beginning of the War of the Rebellion. After retiring from the army in 1863, he was appointed Chief Engineer of the Hudson River Railroad. In 1869 he became engaged in surveying in Colorado, and afterward was Chief Engineer of the Kentucky Union Railroad and located that line from Paris to Hazard. He was afterward engaged in surveying government land in Dakota. He has been for several years engaged in surveying in Kentucky.

ELECTIONS AND APPOINTMENTS.

Atchison, Topeka & Santa Fé.—The offices of the company in New York City are to be moved to Chicago, with the exception of Col. J. J. McCook, General Counsel and Receiver, who will be the only representative of the corporation in New York. Receiver Walker announces that the change is to be made as a measure of economy of operation as well as convenience. It is proposed to consolidate all the offices at Chicago, with the exception of those now at Topeka, Kan.

Atlantic Coast Line.—J. R. Bissett has been made foreman of the shops at Rocky Mount, Va. He was formerly a locomotive engineer on the road.

Baltimore & Ohio Southwestern.—Following the appointment of John M. Chesbrough as General Passenger Agent, several important changes in that department are announced. T. C. Wells, who has filled the office of District Passenger Agent at St. Louis for several years, retires from the company's service, and is succeeded by W. P. Townsend, Traveling Passenger Agent, with headquarters at Vincennes, Ind. Mr. Townsend is a brother of H. C. Townsend, General Passenger Agent of the Missouri Pacific. He will assume the duties of his new position on Oct. 15. J. F. Hoffner, who was City Passenger Agent in St. Louis until a few weeks ago, when he resigned, has been appointed chief clerk in the office of Assistant General Passenger Agent George B. Warfel at Cincinnati. W. G. Brown, of Cincinnati, goes to St. Louis to become chief rate clerk in Mr. Chesbrough's office, succeeding Mr. Joyce, who was made chief clerk some time ago.

Boston & Albany.—Mr. Walter Shepard, whose office is at Boston, has been made Chief Engineer, to succeed Mr. W. H. Russell, with office at Springfield, whose title is now Consulting Engineer.

Boston & Albany.—At the annual meeting held in Boston, Sept. 26, the old directors were re-elected.

Brookline & Pepperell.—At the annual meeting held in Boston, Mass., on Sept. 26, Frank Leighton, Thomas S. Hittinger, Charles Fairchild, Franklin Worcester, Edmund D. Codman, Herbert I. Wallace, Charles E. Ware, L. H. H. Johnson and Daniel A. Gleason were elected Directors.

Cleveland, Cincinnati, Chicago & St. Louis.—L. L. Hyde has been appointed Freight Claim Agent, with headquarters at Cincinnati. The appointment takes effect Oct. 1.

Elgin, Joliet & Eastern.—C. S. McManus, formerly Trainmaster, has been appointed Superintendent of Transportation, with headquarters at Joliet, Ill. The office of Trainmaster is abolished.

Fitchburg.—At the annual meeting of the stockholders held in Boston, Sept. 26, the old Board of Directors was re-elected. William L. Chase was elected to succeed the late F. L. Ames. John Quincy Adams, recently deceased, was a Government Director, and his place has not yet been filled.

Great Northern.—General Traffic Manager Finley announces the following appointments, some of which have been previously reported: P. P. Shelby, Assistant General Traffic Manager, with headquarters at Seattle, Wash.; G. O. Somers, General Freight Agent, with headquarters at St. Paul; W. J. Evans, Assistant General Freight Agent, with headquarters at St. Paul; A. Gray, Assistant General Freight Agent, with headquarters at St. Paul. The assistant general traffic manager and the general freight agent will report to the general traffic manager.

Lancaster & Reading Narrow Gage.—The Lancaster & Reading Narrow Gage, which was recently purchased at public sale by Charles H. Locher, of Lancaster, Pa., was organized on Sept. 25 by the election of the following officers: President, Charles H. Locher; Secretary, David McMullen; Treasurer, P. E. Slaymaker; Directors, S. E. Bailey, Samuel L. Carpenter, John Hertzler, Robert E. Locher, H. Z. Rhoades and John B. Roth.

Lehigh Valley.—O. O. Esser, Superintendent of the North Branch division, with headquarters in Wilkesbarre, Pa., has had his jurisdiction extended over the Seneca division to Manchester, N. Y. His headquarters will be in Sayre, Pa. The North Branch and the Seneca divisions will be consolidated and will hereafter be known as the Pennsylvania & New York division.

Lehigh Valley.—W. W. Bryan, Passenger Agent at Wilkes-Barre, Pa., has resigned and will locate in Philadelphia. Charles Heller, Passenger Agent at Allentown, in charge of the Lehigh division, has had his territory extended to include the coal branches and the Wyoming division.

Minneapolis & St. Louis.—William L. Bull, of New York City, has been elected President of this company.

New York, Ontario & Western.—The annual meeting of the stockholders was held at New York, Sept. 26. The number of shares represented at the meeting in person or by proxy amounted to nearly 400,000 out of a total of 580,000 shares. The total vote cast was 384,190 shares. The following Directors were re-elected: Frances R. Culbert, Newburgh, N. Y.; Charles S. Whelen, Philadelphia; T. P. Flowes, Richard Irwin and John B. Kerr, New York; Joseph Price and H. Pearson, London, Eng.; William H. Paulding, Henry W. Cannon, Albert S. Roe and Eben K. Sibley, New York; E. B. Sturges, Scranton, Pa.; Gerald L. Hoyt, New York. Messrs. Barrow, Wade, Guthrie & Co. were re-elected Auditors. After the stockholders' meeting, Thomas P. Fowler was re-elected President; Joseph Price, Vice-President; John B. Kerr, Vice-President and General Counsel; Richard D. Rickard, Secretary and Treasurer. James E. Childs was reappointed General Manager, and Charles S. Whelen, Chairman of the Executive Committee.

Paragould Southeastern.—The annual meeting was held in Paragould, Ark., on Sept. 26, and the following officers were elected: W. C. Hasty, President, and General Manager; A. Bertig, Vice-President and S. Bertig, Treasurer; all with headquarters at Paragould, Ark.

Pennsylvania.—C. H. Haggerty has been appointed District Passenger Agent, and A. Anderson City Ticket Agent at Louisville, Ky.

Peoria, Decatur & Evansville.—At a meeting of the stockholders held in Peoria, Ill., Oct. 2, W. H. Goadby, Arnold Kummer and R. S. Anderson, of New York City, were elected Directors.

Saginaw, Tuscola & Huron.—Sanford Keeler has been appointed General Manager, with headquarters at Saginaw (East Side), Mich. He will have general charge and authority, subject to the directions of the President of the Board of Directors. M. V. Meredith will continue as Superintendent

Southern Railway Co.—L. A. Shipman, who has been Traveling Passenger Agent, with headquarters in Birmingham, Ala., for the past year or two, has been appointed Passenger Agent of that company in New Orleans.

J. J. Farnesworth, of Atlanta, who has been with the East Tennessee, will succeed Mr. Shipman at Birmingham.

St. Louis, Alton & Terre Haute.—E. F. Hilgard has been appointed Assistant General Freight and Passenger Agent of the Cairo Short Line. George R. Buttles, formerly Traveling Freight and Passenger Agent, succeeds Mr. Hilgard as General Agent at East St. Louis.

Wagner Palace Car Co.—W. O. Chase, formerly Assistant Division Superintendent has been appointed Superintendent of the Western Division of this company, with headquarters in Chicago. C. R. Wager, formerly Assistant Division Superintendent, has been appointed Superintendent of the Eastern Division, with headquarters in New York.

Yazoo & Mississippi Valley.—F. B. Bowes has been appointed Assistant General Passenger Agent of the Illinois Central and the Yazoo & Mississippi Valley roads, to succeed J. W. Coleman, resigned. He will have jurisdiction over the Southern lines of these companies, and will have headquarters at New Orleans. W. R. Israel has been appointed General Northern Agent, with headquarters at Chicago, to succeed F. B. Bowes. Both appointments take effect Oct. 1.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Buffalo, Attica & Arcade.—The work of laying the standard gage on the railroad is progressing rapidly, and large forces of men are at work at Earls, Johnsonburg and Java Center, N. Y. The work of laying the ties is nearly completed along the line, and it is expected that the narrow gage will be removed and the rails for the standard gage put in place this week. It is also expected that the road between Couriers and Attica, a distance of 22 miles, will be completed by Jan. 1. The trestles and bridges along the entire line have been rebuilt and all are completed with the exception of the large bridge at Attica, which will be begun during the month.

Chicago, Paducah & Memphis.—The track laying on this road has been completed to Marion, Ill., and the road opened for traffic from that town to Mt. Vernon, 40 miles, as noted last week. The northern section between St. Elmo and Mt. Vernon, 50 miles, is being graded as fast as possible and when completed will open up a new and direct route between Marion and Chicago. The persons building this road control the Paducah, Tennessee & Alabama, and the Tennessee Midland south from Paducah to Memphis.

Choctaw, Oklahoma & Gulf.—The two surveying parties, from Oklahoma City on the west and McAlester on the east, are now within a short distance of each other, and expect to complete the survey for the completion of that connecting line of the road in a few days. It is now almost certain that construction work will begin in October. The line is to be over 100 miles in length.

Cleveland, Lorain & Wheeling.—This company commenced last week laying rails on the extension of its line from Lester, Ohio, into Cleveland, 20 miles. A foot bridge has been thrown across the creek at that point, and the railroad bridge is well under way. The work is being pushed, and it is hoped to have the track down during this month.

Great Northern.—The company has recently undertaken considerable improvement and new construction work on its line through Western Washington. The work now under way will engage a force of over 600 men for several months. Porter Brothers have the contract for the construction of three miles of new road where the washout occurred last Spring above Wenatchee. There are two work trains and crews engaged in making a new grade at another point which will not be finished much earlier than November. John F. Stevens & Co., of Spokane, have the contract for a large amount of crib work. A contract has also been let for an extensive snow shed on the switchback. A new wharf is to be constructed at Wenatchee to accomodate the boats which carry wheat from the Big Bend district and fruit from along the Wenatchee Valley.

Gulf & Interstate.—The company formed to build the Texas portion of this railroad has been recently organized and last week a new state charter was secured. This amended charter provides for a main line extending from Bolivar Point, which is opposite the city of Galveston, across the State to its northern line at a point on the Red River near the boundary line of Fannin and Grayson counties, a distance of perhaps 300 miles. A branch is also authorized from the main line near Bolivar Point northwesterly to the Sabine River in Newton County, near Burr's Ferry, a distance of 80 miles. The capital stock is increased from $200,000 to $500,000. President de Normandie has made application to the Texas Railroad Commission for authority to issue bonds to the extent of $10,000 per mile on the completed railroad from Bolivar Point to Beaumont. This line through Bolivar Peninsula is now graded for over 30 miles and the contract has been made to complete 40 miles additional within 60 days. The King-Charles Construction Co., of Pittsburgh, in which D. J. Mackey, of Evansville, Ind., is stated to be interested, has the contract for ballasting, supplying ties and furnishing the rails for this portion of the road. This contract, however, is dependent on the success of those interested in the construction company in placing the bonds of the railroad company. Under their contract they have 30 days more to make satisfactory arrangements.

Roaring Creek & Charleston.—The construction forces now working on this road along Roaring Fork in West Virginia number 500 men and teams. The work is in progress under C. I. McDonald, who has headquarters at Elkins, W. Va. Elliott Holbrook of Pittsburg is Chief Engineer. The road, as far as located, crosses Tygarts Valley River from its junction with the West Virginia Central, eight miles west of Elkins, follows Roaring Creek seven miles to the mouth of Flat Bush, then up Flat Bush five and a half miles down to the Summit, then down Cranberry and Cassida Fork six miles to Middle Fork River. The line reaches good coal properties, and several mines are shipping coal.

Santa Fe, Prescott & Phœnix.—There is said to be a good prospect of work beginning soon on an extension of this road south of Phœnix, Ariz. The railroad, with a working force of 1,500 men, is now at Congress, about 80 miles north of Phœnix and will reach the latter city in February. From Phœnix a franchise has been secured for an extension to Florence, Tucson, Calabesas and Nogales, where connection will be made with the Sonora line of the Atchison.

San Pete Valley.—The grading has been completed on the 8-mile extension of the road beyond Manti, Utah. Track laying will begin in a few days and within another month trains will run into Morrison, the new coal camp. This extension makes the mileage of the road 52 miles, extending from Nephi through the fertile San Pete Valley to the present terminus. President Theodore Bruback has gone to England, where he expects to obtain enough capital to make a further extension of the line south to Nevada.

Southwestern Mineral.—This company was incorporated last week with directors and officers of the Missouri, Kansas & Texas road as directors of the new company. The road will be built from near Parsons, Kan., southeast to Joplin, Mo., chiefly to connect the Missouri, Kansas & Texas with the coal fields in Cherokee County, Kansas, where one of its subsidiary companies, the Southwestern Coal & Improvement Company, has purchased large tracts of land and will open and operate coal mines. It is expected that this project will add largely to the earnings of the Missouri, Kansas & Texas, besides making provision for fuel for the road from the company's own mines on the northern end, as is done on the southern end of the road from the Southwestern Coal & Improvement Company's mines in the Indian Territory.

Trinity, Cameron & Western.—M. R. Kelly, of Georgetown, Tex., has proposed a consolidation of the Georgetown & Granger Railroad and the Trinity, Cameron & Western, two uncompleted railroads in Texas, whose projected lines would connect if either road were built. The Georgetown & Granger owns a graded roadbed about 10 miles long between the towns named. The other road has surveyed a line from Cameron near Georgetown to Trinity, Tex.

Unionville, Conn.—The bridge over the Farmington River on the line of the Hartford & West Hartford Railroad, has been completed. It is a single span iron bridge 132 ft. long and 16 ft. wide, and was built by the Berlin Iron Bridge Co.

Utah & Wyoming.—The Directors make the public announcement that they have decided to go ahead with the construction of this line from Salt Lake City to Coalville, Utah. This project is an old one, but recently negotiations have been going on to float the securities of the company. The Directors decided to complete the line from Salt Lake City to Coalville, via Park City. From the latter point to Coalville, it is claimed, a narrow gage grade is completed. The officers are B. F. Raybould, President; W. L. Pickard, Vice-President; S. F. Walker, Secretary and Treasurer, and Edmund Wilkes, Chief Engineer. Nothing is said as to the time when actual construction work will begin.

West Virginia, Ohio & Western.—This company, which was incorporated in West Virginia in July last, proposes to build a railroad from a connection with the West Virginia Central & Pittsburg at Belington, W. Va., a long the valleys of Buckhannon River and Elk Creek, and along the valley of that stream to Clarksburg, W. Va., thence along the West Fork of the Monongahela River and Ten Mile Creek and Fishing Creek, to New Martinsville on the Ohio River, in Wetzel County. It is to be a connecting link between two railroads, of which Senator J. N. Camden is the moving spirit, the West Virginia & Pittsburg, and the Ohio River roads, and also to connect these systems with the Davis-Elkins system, the West Virginia Central & Pittsburg. Plans are also under consideration for a bridge across the Ohio River, at New Martinsville. The road from Belington to New Martinsville passes through a great field of soft coal, the veins being from seven to nine feet in thickness, and opened at only a few points. This coal has been tested and found to be suitable for cooking purposes. The incorporators of the company are Marcus Pollasky, T. M. Jackson, J. C. Lawrence, R. M. Despard, and J. Horner Davis. Chief Engineer Thomas Pettigrew, of the Ohio River Railroad, with headquarters at Parkersburg, has had a force of engineers in the field since early in August, and has completed the surveys of the road.

Wheeling Bridge & Terminal.—This company has completed the surveys for the extension of its line from the Riverside Iron Works, in Benwood, W. Va., to the plant of the Wheeling Iron & Steel Co., two miles below. The line is to be built this winter, and will be an expensive piece of work, as it passes the entire distance through the town of Benwood. The money for the extension has been provided through the issue of receiver's certificates.

GENERAL RAILROAD NEWS.

Atlanta & Florida.—An application has been made in the United States Court in Atlanta, Ga., in behalf of the Atlanta Trust Company for the appointment of a receiver for the Atlanta & Florida Railroad Company, which extends from Atlanta to Fort Valley, Ga., 105 miles.

Dominion Atlantic.—The amalgamation of the Windsor & Annapolis and Western Counties Railways, in Nova Scotia, went into effect October 1. The line will hereafter be known as the Dominion Atlantic Railway Company, operating a through line from Halifax to Yarmouth.

Fitchburg.—At the annual stockholders' meeting in Boston last week the consolidation of the Brookline & Pepperell, the Brookline Railroad and the Brookline & Mil-

ford road branches with this company was formally approved. These are short branch roads from a point on the Fitchburg Railroad near the northern State line of Massachusetts to Brookline, N. H., and they are about 15 miles long altogether. In addition the stockholders authorized the directors to issue at their discretion $2,000,000 of new bonds, as reported in this column last week.

Atchison, Topeka & Santa Fe.—The earnings of this system for the month of July, 1894, compared with the same period of 1893 are given in the following table:

ATCHISON, TOPEKA & SANTA FE SYSTEM PROPER.

	1894.	1893.		Decrease.
Average operated mileage	6,695	6,719		24
Gross earn	$1,621,283	$2,764,054	D	$1,142,771
Oper. expen	1,6-9,614	1,902,072	D	272,458
Net earn	Def. $8,331	$861,982	D	$870,313

AGGREGATED SYSTEM.

Average operated mileage	9,321	9,344	D	23
Gross earn	$2,395,951	$3,727,671	D	$1,331,720
Oper. expen	2,178,487	2,598,010	D	419,523
Net earn	$217,464	$1,129,661	D	$912,195

Chesapeake & Ohio.—The returns for August make the following comparisons:

	1894.	1893.	Inc. or Dec	
Gross earn	$9.5,388	$892,871	I	$42,517
Oper. expen	603,580	572,014	I	31,566
Net earn	331,808	320,857	I	10,951
Two months:				
Gross earn	1,744 839	1,747,984	D	3,145
Oper. expen	1.113,728	1,133,753	D	20,025
Net earn	$631,111	$614,231	I	$16,880.

Georgia Southern & Florida.—The Reorganization Committee announces a plan providing for the formation of a new company, which will issue $4,000,000 first mortgage 5 per cent. bonds, $684,000 of first preferred, $1,015,600 second preferred, and $4,000,000 of common stock. These securities are to be given for the securities of the old companyon the following basis: For each bond of the old issue deposited with the Committee, $1,000 first mortgage five per cent. bond; $200 in first preferred five per cent. stock; $180 in second preferred five per cent. stock; $806 in common stock. The first and second preferred stocks are issued to represent the overdue coupons and the reduction of the rate of interest on the new bonds to five per cent. The Reorganization Committee consists of H. P. Smart, Chairman, Savannah; Thomas R. Gresham, Baltimore; D. U. Hermann, New York; W. C. Shaw, Secretary, Baltimore; Charles Watkins, Richmond; Henry Rice, New York, and Charles D. Fisher, Baltimore.

Louisville, New Albany & Chicago.—A mortgage for $1,000,000 in favor of the Central Trust Co., of New York, and John Murdock, of Lafayette, Ind., trustee, has been filed by this company in the County Recorder's office in Crown Point, Ind.

New York Central & Hudson River.—The earnings and expenses of this company for the quarter ending September 30, 1894, and for the same period of 1893 are given below. The figures for 1894 are estimated, those for 1893 being actual.

	1894.	1893.	Inc. or Dec.	
Gross earn	$10,922,000	$12,211,847	D	$1,289,847
Oper. expen	7,184,000	8,268,089	D	1,084,089
Net earn	$3 738,000	$3,943,758	D	$205,758
Charges	2,635,000	2,629,848	I	5,152
Profit	$1,103.000	$1,313,910	D	$210,910
Dividend	1,193,000	1,117,853	I	75,147
Deficit	$90,000	Sur. $196,056	D	$286,056

Central of New Jersey,—The report of earnings for August, makes the following comparisons with 1893:

	1894.	1893.	Inc. or dec
Gross earn	$1,155,846.56	$1,281,943.46	$126,096.90
Oper. exp	743,287.71	726,424.67	16,863.04
Net	$412,558.85	$555,518.79	$142,959.96

New York, Lake Erie & Western.—The earnings and expenses for the month of August and for the 11 months of the fiscal year, with comparisons with the same period of 1893 are given in the following table:

Month of August—	1894.	1893.		Decrease.
Gross earn	$2,274,224	$2,523,534	D	$249,310
Oper. expen	1,486,748	1,618,019	D	131,271
Balance	787,476	905,515	D	118,039
Rentals	218,184	232,647	D	14,463
Net earn	$569,292	$672,868	D	$103,576
Oct. 1 to Aug. 31—				
Gross earn	$22,979,260	$27,407,423	D	$4,428,163
Oper. expen	16,381,496	18,564,861	D	2,183,365
Balance	$6,597,764	$8,842,562	D	$2,244,798
Rentals	2,061.795	2,437,816	D	376,021
Net earn	$4,535,969	$6,404,746	D	$1,868,777

New Roads.— A preliminary survey for a narrow gage line from Florence, Colorado, to Silver Cliff, is now under way, making excellent progress. The steepest grade will not exceed 3 per cent.

At a meeting held at Ottawa, Ont., last week it was decided to proceed at once with the construction of a railway between Carp and Bridgewater.

New York, Ontario & Western.—The annual meeting in New York on Sept. 26, resulted in the election of the old management as reported in another column. The only incident out of the routine which came up at the meeting was the introduction of the following resolution by a large stockholder: "Whereas, the control of the company is at present vested in 60 shares of preferred stock, which control will revert to the common stockholders whenever any dividends shall have been paid to them; Resolved, That it is the duty of the Directors to terminate at once the control exercised by the preferred stock, by declaring a dividend, however small, out of the $1,600,000 accumulated profits, shown by the accounts as belonging to the common shareholders." President Fowler explained the nature of the voting trust, which was created at the time 20,000 shares of preferred stock were outstanding, whereby the stockholders gave the preferred holders the power to elect eight out of the 13 directors until a dividend was paid on the common stock. Mr. Fowler said that he hoped the day was not far distant when a dividend could be declared and he thought the incoming Board would be glad to confer about terminating the trust. The resolution was referred to the new Board.

Peoria, Decatur & Evansville.—The various interests in this property are making an active contest to get into a position where they can control the reorganization of the property. The second mortgage bondholders have threatened foreclosure of the property under that mortgage, which can be done after next January. The first mortgage bondholders cannot bring foreclosure proceedings because the interest has so far been paid on those bonds, although not when due. The company has first mortgage bonds outstanding for $3,007,000, second mortgage bonds for $2,088,000, and other bonds and debts bringing its total liabilities up to $6,847,848.

Pennsylvania.—The report of August earnings on the Eastern lines shows, for the first time in many months, an increase in gross. The expenses decreased greatly so that the net earnings were greater by half a million dollars than in 1893, and including the Western lines the net increase is over $700,000. The figures for the month and the fiscal year to date, follow, for the Eastern lines:

	1894.	1893.	Inc. or Dec.	
Gross earn	$5,739 055	$5,471,977	I	$267,078
Oper. expen	3,424,638	3,661,874	D	237,236
Net earn	$2,314,417	$1,810,103	I	504,315

Net earnings in 1892 were $2,224,893; 1891, $2,451,410 and in 1890, $2,292,026.

The gross earnings of Western lines in August increased $152,391 and net earnings increased $269,432. Gross earnings of the system increased $419,469 and net increased $773,747.

Eastern lines for eight months show:

	1894.	1893.	Inc. or Dec.	
Gross earn	$36,746,549	$44,909,433	D	$8,162,884
Oper. expen	26,152,601	32,733,361	D	6,580,760
Net earn	$10,593,948	$12,176,072	D	$1,582,124

Net earnings in 1892 were $12,475,592; in 1891, $13,234,673, and in 1890, $12,623,736.

Gross earnings of Western lines for eight months decreased $5,098,031, and net earnings decreased $1,482,519. The system for eight months shows gross earnings decreased $13,260,915 and net earnings decreased $3,064,426.

Philadelphia & Reading.—The financial statement of the railroad company for August and nine months is given in the following table:

	1894.	1893.	Inc. or Dec.	
Gross earn	$1,783,666	$1,896.266	D	$112,600
Oper. expenses	1,009.058	1,074,757	D	65,699
Net earn	$774,608	$821,509	D	46,901
Other income	23.892	27,539	D	3,647
Total	$798,500	$849,048	D	$50,548
Fixed charges	878,395	818,987	I	59,408
Deficit	$79,896	Sur. $30,061	I	$109,956

The equipment payments increased $54,662, and Broad street improvements $18,423, all in charges, while interest payments decreased $13,678.

Nine months:

Gross earnings	$14,624,743	$16,806,947	D	$2,182,204
Net earnings	6,218,014	6,433,602	D	215,588
Deficit	1,296.545	1,059,582	I	236,963

The Coal and Iron Co. reports gross earnings of $1,589,386 for August, $64,615 net, a decrease of $104,812. The deficit for the month is $126,402. For the nine months gross earnings were $15,734,408, a decrease of $6 75,529; net earnings were only $106,557, and the deficit reached $951,659. In 1893 it was $729,932 for the same period.

St. Louis & San Francisco.—At the request of holders of the four per cent. consolidated mortgage bonds of the company, Francis Peabody, Jr., of Boston, J. Kennedy Tod and Frederick W. Whitridge, of New York, have been organized as a committee to protect those bonds, which, though guaranteed by the Atchison, Topeka & Santa Fé Railroad Co., are in default, and have prepared a bondholders' agreement.

TRAFFIC.

Traffic Notes.

A traffic bureau has been established in Richmond, Va., by the Chamber of Commerce. The manager is Mr. E. S. Goodman, recently of the Norfolk & Western Railroad.

The Ohio Coal Traffic Association met in Cleveland last week, but the reports state that only routine business was transacted.

The Railroad Commissioners of North Dakota have called upon the Great Northern and the Northern Pacific to show cause why the rates of freight on coal should not be reduced by the Commissioners to the basis of 75 cents a ton for 50 miles, $1.55 a ton for 250 miles, $2.15 a ton for 500 miles and for other distances in proportion. It is said that these rates are at least one-third, often more than one-third, smaller than those now in force.

The suit of the Interstate Commerce Commission against the Louisville & Nashville and other Southern roads for refusing to reduce freight rates from the Ohio River to Southern points was entered in the United States Circuit Court at Cincinnati, Sept. 26. The complaint names as defendants all the prominent roads in the territory affected and refers in detail to the war rates, 50 per cent. lower than those ordered by the Commission as well as to the excessive rates put in force on Aug. 1. Judge Sage orders that the proceedings shall be conducted in a summary manner without formal pleadings, etc.; but he gives the roads nearly four weeks in which to answer, and until Nov. 19 to appear in court.

The regular monthly statement of through freight from the Pacific coast for the month of August, compiled by the Southern Pacific, shows a large increase over August of last year. The quantities from the principal points are as follows (tons):

	August.	Eight Months.
San Francisco	36,022	167,309
Oakland	3,093	10,594
Sacramento	29,065	75,825
San Jose	3,584	16,163
Stockton	4,760	21,686
Marysville	3,289	8,020
Portland	3,394	8,478
Total	83.207	308,080
Same time in 1893	49,917	235,101
Increase	33,290	73,979

The conference of the General Passenger Agents of the Central Traffic, Trunk Line and Western Passenger associations, held in connection with the meeting of General Ticket Agents at Quebec, agreed to the cancellation on October 1 of the circulars issued by the Chicago eastbound lines announcing an arbitrary mileage between Chicago and Buffalo, to be used in divisions of through rates. A committee of arbitration was appointed to which all disputes concerning divisions of through rates are to be referred. It was also agreed that all future issues of coupon tickets shall show on each coupon the destination as well as the selling point of the ticket.

Wholesale merchants in St. Joseph, Mo., have been offering free tickets to country merchants in Colorado if they would come to St. Joseph to buy their goods. This practice is indulged in considerably at various cities in the West and Commissioner Janes, of the Denver Traffic Association, has asked the freight bureaus in St. Louis, Kansas City, Cincinnati, New Orleans, Galveston, Omaha and Chicago to join him in an effort to abolish the practice.

Shipments of canned meats to China and Japan have been heavy of late, in consequence of the war between those countries, and competition between the steamships of the Canadian Pacific and those from San Francisco is active. The Pacific Mail has reduced the rate from $12 a ton to $5.

Receiver Trumbull, of the Denver, Leadville & Gunnison, has sent a letter to all agents calling for information as to the possible increase of business at their respective stations: He says: "I shall be glad to have you write to the various heads of departments giving them the benefit of your local observations in regard to measures that may enhance the revenue of the railroad at your station. What is particularly desired is: 1. Explanations as to causes leading to increase or decrease of local business, either freight or passenger; 2. Mention of any possibilities of new business worthy of particular notice such as the opening of new mines, saw mills, etc. You are requested to offer suggestions and express opinions freely concerning the traffic of your station and its neighborhood. I desire you to give us the aid of your intelligence and experience, believing that you may bring to our knowledge many important points that might otherwise be overlooked."

Chicago Traffic Matters.

CHICAGO, October 3, 1894.

Freight tonnage by rail showed a considerable increase last week, and its distribution on eastbound shipments apparently indicates that the lines are "evening up."

Receipts of flour and grain last week were: Flour, 99,421 bbls.; wheat, 559,318 bu.; corn, 1,091,370 bu.; oats, 1,393,650 bu.; rye, 30,285 bu.; barley, 772,450 bu. Shipments, flour, 91,251 bbls.; wheat, 534,676 bu.; corn, 1,002,931 bu.; oats, 1,015,431 bu.; rye, 15,281 bu.; barley, 380,351 bu. Receipts of corn and wheat were less than one-half the number of bushels received during the corresponding week of 1893.

Lake freight rates were fairly well maintained. The rate on corn held firm at 1⅜ cents; wheat, 1½ cents to Buffalo. The 50-cent rate on coal westbound shows signs of weakening 5 cents, owing to the competition of some of the big iron steamers not in the agreement. Duluth reports heavier receipts of grain; rates unchanged.

Another example of the way the roads keep their agreements was recently afforded by the opening of bids for the transportation of United States troops from Fort Leavenworth to Governor's Island and Atlanta. The roads had agreed upon a rate to be named, but when the bids were opened it was found that bids for the trip to the East had been made by several of the western lines, cutting the regular tariff about one-third. The Burlington, being the lowest bidder, secured the contract. On the second lot to Atlanta, the Missouri Pacific secured the troops at a reduction of over 40 per cent. it is stated.

The conference of western and eastern lines last week, to agree, if possible, with the officials of the Indiana, Illinois & Iowa and the Elgin, Joliet & Eastern upon a reduction of divisions with those lines, was unable to agree and the whole matter has been referred to Commissioners Goddard and Blanchard for further conference with the officials of the two roads.

Another attempt was made last week by the passenger officials of Central Traffic Association lines to agree upon a plan for the division of eastbound business, but owing to the absence of several important members the report of the committee was deferred until October 11.

Another war in export grain rates has been precipitated by the refusal of the Kansas City, Fort Scott & Memphis to put its New Orleans business into the agreement between the other lines in the Western Trunk Line Committee. The regular rate from Kansas City to New Orleans is 21 cents. The Memphis Road has for some time been quoting a rate of 15 cents. Failing to get the rate raised, the Missouri Pacific met it. The result is that the two roads took nearly all the export grain from Kansas City during September. The Chicago & Alton finally abandoned hope of saving the rates, and made a bargain with the C., C., C. & St. L., and the Chesapeake & Ohio to pro-rate on a rate of 20 cents from Kansas City to Newport News. As the Newport News route is superior to the New Orleans for export grain, the 20-cent rate is likely to take the grain unless, as is probable, the Memphis and the Missouri Pacific make further reductions.

Another attempt is to be made to secure the adoption and enforcement of an agreement to discontinue the issuance of passes to shippers, to become effective January 1 next.

The Committee of the Chicago Live Stock Exchange has made a formal protest to the eastern lines against the $2 switching and terminal charge, as was done with the western lines.

The shipments of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending Sept. 29, amounted to 53,852 tons, against 52,472 tons during the preceding week, an increase of 1,380 tons, and against 51,750 tons for the corresponding week last year. The proportions carried by each road were:

ROADS.	WEEK TO SEPT. 29.		WEEK TO SEPT. 22.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	3,834	7.1	3,596	6.8
Wabash	6,475	12.0	4,234	8.1
Lake Shore & Mich. South.	6,126	11.4	5,660	10.8
Pitts., Ft. Wayne & Chicago.	5,323	10.0	5,674	10.8
Pitts., Cin., Chi. & St. Louis	7,250	13.4	7,969	15.2
Baltimore & Ohio	3,347	6.2	3,206	6.1
Chicago & Grand Trunk	6,702	12.4	7,011	13.4
New York, Chic. & St. Louis	5,857	10.9	6,999	13.3
Chicago & Erie	6,235	11.6	5,751	11.0
C. C. C. & St. Louis	2,703	5.0	5,372	4.5
Totals	53,852	100.0	52,472	100.0

Of the above shipments 1,376 tons were flour, 20,820 tons grain and mill stuff, 9,435 tons cured meats, 10,972 tons dressed beef, 1,278 tons butter, 2,095 tons hides, and 4,605 tons lumber. The three Vanderbilt lines carried 29.4 per cent., the two Pennsylvania lines 23.4 per cent. Lake lines carried 54,682 tons against 62,036 tons last week.